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DEPARTMENT OF TRANSPORTATION
MARYLAND TRANSIT ADMINISTRATION



Baltimore, Maryland
Baltimore Red Line
Red Line General Engineering Consultant

Alternatives Technical Report – 2012 Update December 2012



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1. Introduction

1.1 Purpose of Technical Report

The purpose of this technical report is to provide an update and further documentation on the development and evaluation of alternatives for the Red Line project. This technical report supports Chapter 2 of the Final Environmental Impact Statement (FEIS) and provides additional detail on the analysis conducted in response to comments received on the Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS). This report was developed as one of the many supporting technical reports for the FEIS and serves as an update to the 2008 Alternatives Technical Report prepared in support of the AA/DEIS.

Throughout the development of the project, several documents have been prepared to document the alternatives development and evaluation process. A PDF copy of each of these reports is included in the appendices of this *Alternatives Technical Report – 2012 Update*. Refer to the Table of Contents for a list of the appendices included with this report.

Throughout the development of the alternatives for the project several key words have been used. These include:

- The **Red Line Corridor Transit Study** was the project name used for the Federal Transit Administration (FTA) planning and project development phase for the AA/DEIS and New Starts Process.
- The **Locally Preferred Alternative** (LPA) refers to the project, as identified by the State, and submitted to the FTA for New Starts approval to enter the Preliminary Engineering phase.
- The National Environmental Policy Act (NEPA) **Preferred Alternative** refers to the project that will be evaluated in the FEIS. The FTA and Maryland Transit Administration (MTA) identified this alternative as preferred for meeting the purpose and need over the other reasonable alternatives considered in the AA/DEIS, including the No-Build Alternative.
- The term **alignment** is used to describe the horizontal and vertical location of the transit route, roadway and railroad components proposed with the project.

1.2 Chronology of Alternatives Development and Evaluation

The 2002 *Baltimore Regional Rail System Plan* recommended a 109-mile Regional Rail System with 66 new miles added to the existing 43 miles of Metro Subway and Light Rail lines. The finished system could have as many as 122 stations, including 68 new stations in addition to the 54 stations that exist now. The Red Line was identified as one of the priority projects for the Plan's implementation.

In 2003, the FTA issued a Notice of Intent (NOI) to prepare a DEIS, Scoping and Alternatives Development followed and based on public and agency input, the FTA and MTA developed a range of alternatives for consideration in the alternatives screening process.

Between 2005 and 2007, the FTA and MTA conducted an alternatives screening process, which was intended to identify a range of alternatives for detailed study in the AA/DEIS.

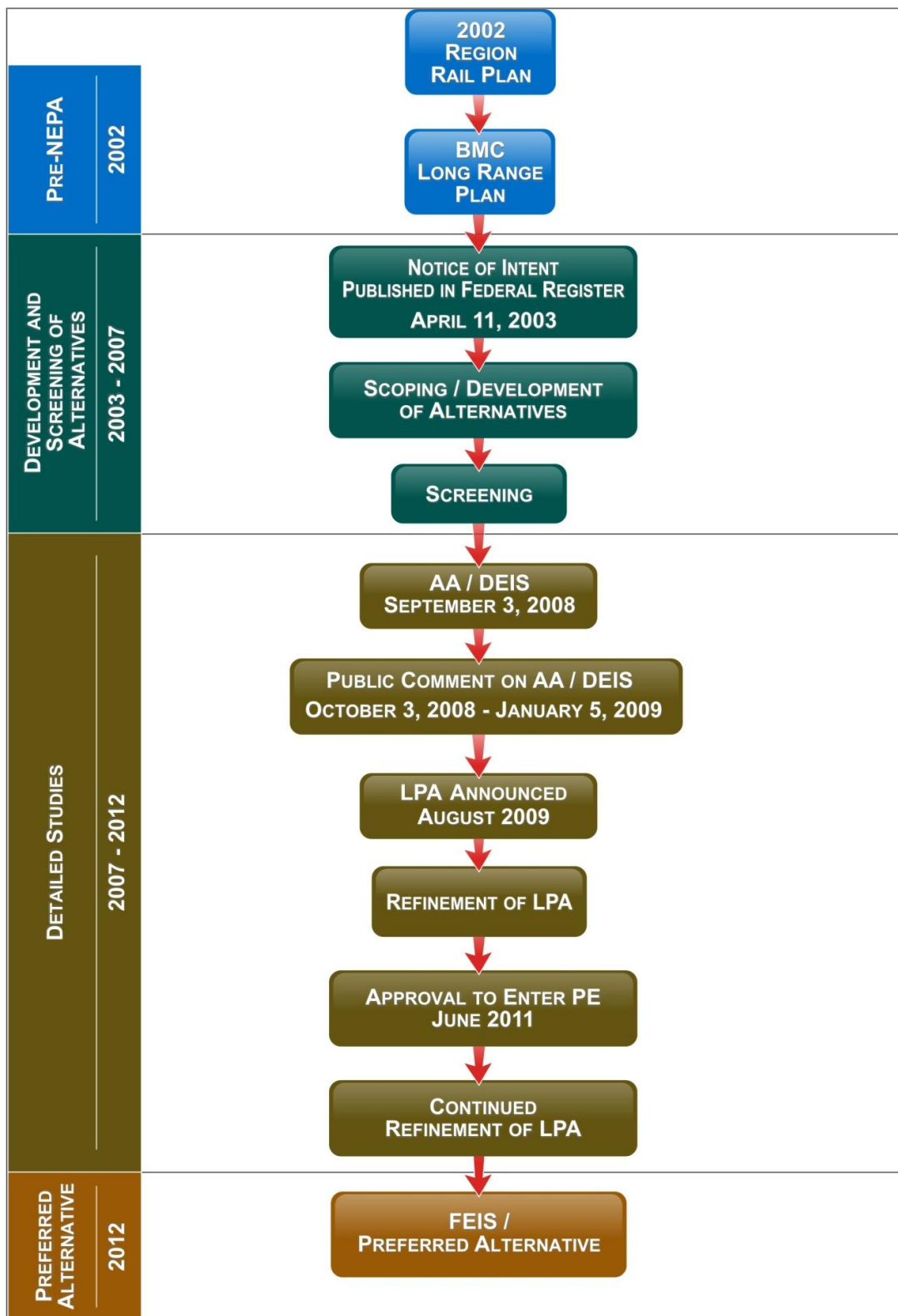
The 2009 AA/DEIS studied in detail four alternatives: No-Build, Transportation Systems Management, Bus Rapid Transit, and Light Rail Transit (LRT). The AA/DEIS was made available for public and agency review between October 3, 2009 and January 5, 2010. The AA/DEIS did not identify a Preferred Alternative; however, the FTA New Starts Process requires the local project sponsor to identify a LPA.

In August 2009, the State of Maryland with consensus from Baltimore City and Baltimore County, identified a 14.5-mile light rail transit alignment from the Centers for Medicare & Medicaid Services (CMS) to Bayview with tunnel alignments under Cooks Lane and through downtown from Martin Luther King, Jr. Boulevard to Boston Street.

Since then, the MTA has conducted technical studies, refined the LPA, and continued the public involvement and agency coordination, including the Station Area Advisory Committees (SAACs). The results of these studies and definition of the Preferred Alternative are presented in the FEIS and supporting technical reports. In accordance with 23 CFR 771.129, the MTA prepared a reevaluation because more than three years had passed since publication of the AA/DEIS for this project. MTA submitted the reevaluation to FTA on August 16, 2012. The reevaluation compared the current Preferred Alternative as examined in the FEIS to the build alternatives considered in the AA/DEIS, and concluded that a Supplemental Environmental Impact Statement (EIS) of the AA/DEIS is not required because there are no new significant environmental impacts beyond those evaluated in the AA/DEIS. In correspondence dated September 17, 2012, FTA concurred with the findings in the reevaluation.

Figure 1 illustrates the chronology of alternatives development and evaluation for the Red Line.

Figure 1: Chronology of Alternatives Development and Evaluation for the Red Line



2. Alternatives Development and Evaluation

Alternatives development and evaluation included initial development of alternatives, screening of alternatives, detailed study, selection of an LPA, and refinement of the LPA, resulting in identification of a Preferred Alternative in the FEIS. Throughout the development and evaluation processes, alternatives were reviewed based on a range of factors, including their ability to meet the project's purpose and need, their cost effectiveness, and environmental impacts. **Table 1** summarizes the project purpose and corresponding needs for the project.

Table 1: Project Purpose and Need

Purpose of the Project	Project Need
Improve transit efficiency by reducing travel times for transit trips in the project study corridor	Roadway congestion contributes to slow travel times for automobiles and buses in the project study corridor
Increase transit accessibility in the corridor by providing improved transit access to major employment and activity centers	Lack of convenient transit access to existing and future activity centers in the project study corridor, including downtown Baltimore, Fell's Point, and Canton, as well as employment areas in Baltimore County to the west of Baltimore
Provide transportation choices for east-west commuters in the project study corridor, by making transit a more attractive option	Lack of viable transit options for east-west commuters in the project study corridor
Enhance connections among existing transit routes in the project study corridor	Lack of connections from existing transit routes (including Central Light Rail, Metro, MARC, and bus network) to the I-70 travel market on the west side of the project study corridor, and to the I-95 and East Baltimore travel markets on the east
Support community revitalization and economic development opportunities in the project study corridor	Need for economic development and community revitalization in communities along the project study corridor, both in Baltimore County and in Baltimore City
Help the region improve air quality by increasing transit use, and promote environmental stewardship	Need to support the regional goal of improving air quality by providing alternatives to automobile usage

2.1 Regional Transportation Planning

In 2002 the Maryland Department of Transportation (MDOT) adopted the *Baltimore Region Rail System Plan*. The plan recommended the expansion of the existing system into a complete regional rail system composed of six lines. **Figure 2** shows the 2002 Regional Rail System Plan with the current Red Line project. Refer to **Appendix A** for a PDF copy of the *Baltimore Region Rail System Plan*.

The existing system consists of two lines: the Baltimore Metro and the Central Light Rail line. Metro is a heavy-rail subway line; it currently operates from Owings Mills in Baltimore County to Johns Hopkins Medical Center in downtown Baltimore. The Central Light Rail line operates from Hunt Valley in Baltimore County to Baltimore/Washington International Thurgood Marshall (BWI) Airport.

Under the 2002 plan, the current Metro would become the Green Line and the Central Light Rail would become the Blue Line. The 2002 plan recommended expanding the existing system with the following additions:

1. Construct the Red Line, which would provide the first east-west rail transit line in Baltimore;
2. Extend the Green Line from Johns Hopkins Medical Center (the existing eastern terminus) to Martin State Airport;
3. Construct the Yellow Line from Hunt Valley to Columbia, which would provide an additional north-south transit line through Baltimore;
4. Establish a new local rail service, known as the Purple Line, in the rail corridor used by the MARC Penn Line, on a parallel track; and
5. Establish a new local rail service, known as the Orange Line, in the rail corridor used by the MARC Camden Line, on a parallel track.

The plan recommended that work begin immediately on implementation of three priority projects: the Red Line, the Green Line extension, and the Purple Line.

The Baltimore Metropolitan Council (BMC) is the official Metropolitan Planning Organization (MPO) for the Baltimore region and is responsible for long-range transportation planning. One of their responsibilities is to maintain a long-range, financially-constrained transportation plan which includes projects for implementation over a 20-year horizon. After the 2002 Baltimore Region Rail System Plan was developed, the BMC placed the Red Line on the Long-Range Transportation Plan. The Red Line project remains in the current version of the long-range plan, *Plan It 2035*, dated November 11, 2011.

Figure 2: Baltimore Regional Rail System Plan Map, Adopted March 2002



2.2 Initiation of AA/DEIS

In April 2003, the FTA issued a N to prepare an AA/DEIS for a Red Line Corridor Transit project, extending from the Centers for Medicare and Medicaid Services in Baltimore County through the Baltimore City central business district (CBD) to Patterson Park in Baltimore.¹ The notice stated that the proposed project “would connect eastern and western communities of Baltimore City and Baltimore County, providing the first east-west fixed rail or bus rapid transit connection in Baltimore, and would provide convenient and efficient access to major employment centers in downtown and in Woodlawn” (68 Fed. Reg. 17855). The notice also

¹ During the alternatives screening process, the eastern terminus was extended to the Johns Hopkins Bayview campus, as described in Section 2.4.1.

stated that the AA/DEIS would “examine and evaluate rail, bus rapid transit (BRT), transportation systems management and transportation demand management (TSM/TDM) strategies, and a No-Build Alternative. Tunnel, surface, and/or aerial construction options will be considered for rail and BRT alternatives.” Refer to **Appendix B** for a PDF of the April 11, 2003 Notice of Intent.

2.3 Scoping and Alternatives Development

Following publication of the NOI, the FTA and MTA initiated a scoping process, which included a series of public scoping meetings, meetings with regulatory agencies, and an ongoing public outreach process. The scoping process identified initial alignments and transit modes to consider for the Red Line. During the scoping process the public, resource agencies, and local stakeholders had an opportunity to comment on initial alignments and modes that would meet the goals for a new east-west transit alignment. Public and agency comments were reviewed and considered when developing alternatives to carry forward to the screening process. Refer to **Appendix C** for a PDF version of the Scoping Process Report.

Based on public and agency input during scoping, the FTA and MTA developed a range of alternatives for consideration in the alternatives screening process. Refer to **Figure 3**. These alternatives included a range of modes and alignments for providing improved transit service in the project study corridor. The alternatives advanced for consideration in the scoping process included various combinations of alignments for BRT and LRT service, as well as a TSM Alternative and a No-Build Alternative. Commuter rail and heavy rail also were considered, but were eliminated, based on the following considerations:

- Commuter rail is primarily applicable to longer distance travel from suburban or rural areas into higher density employment areas. The project study corridor does not incorporate the distances appropriate to commuter rail. Therefore, commuter rail is not a reasonable alternative for this project.
- Heavy rail (a technology used in the Metro rail system in Baltimore) allows for higher operating speeds and greater capacities, but it requires total grade separation, meaning it must be located in tunnels and/or aerial structures at all roadway crossings. As a result, heavy rail is far more costly to construct than a bus or light rail system. Based on analysis of this alternative, MTA concluded that heavy rail would not meet FTA’s cost-effectiveness requirements for funding under the New Starts program. Even if it had been able to meet those requirements, MTA would not have sufficient funding to cover its share of the cost of a heavy rail project. Because of these cost and cost-effectiveness concerns, heavy rail also is not a reasonable alternative for this project. Refer to **Section 2.4.2** of this technical report for additional information on the heavy rail alternatives considered by the MTA.

2.4 Screening of Alternatives

Between 2005 and 2007, FTA and MTA conducted an alternatives screening process, which was intended to identify a range of alternatives for detailed study in the AA/DEIS. The screening process included consideration of a large number of potential alignments for BRT and LRT service within the project study corridor (refer to **Figure 3**). This process occurred in two stages. The first stage involved a preliminary screening of conceptual alignments. The results of this analysis were documented in the May 2005 report, *Screening of Preliminary Alternatives*, and were presented at a series of public workshops in November 2005. Refer to **Appendix D** of this technical report for a PDF version of the 2005 *Screening of Preliminary Alternatives Report*. After those workshops, further analysis was performed to address several additional alignments and other options based on input received from the public. As part of this second stage, MTA decided to extend the eastern terminus of the project from Patterson Park to the Johns Hopkins Bayview campus, and considered a range of alignments for connecting to the campus.

Throughout the screening process, alignments were evaluated based on a consistent set of evaluation criteria, which are documented in Table 1 of the *2008 Alternatives Technical Report* and in *Appendix 1 of the 2005 Preliminary Screening Report*. As summarized in the AA/DEIS, the evaluation criteria included:

- Ability to address project purpose & need (refer to **Table 1**);
- FTA New Starts criteria;
- Engineering & cost - such as meets engineering design requirements and avoids higher capital cost;
- Extent of environmental impacts to parklands, air quality, noise, historic properties, and other resources;
- Mobility & operational factors such as travel time, traffic, transit connections
- Accessibility for population & jobs; and
- Public input.

Given the large number of potentially reasonable alternatives for completing a BRT or LRT project in the project study corridor, the screening process focused on weighing the relative advantages and disadvantages of the various alignments under consideration. As stated in the AA/DEIS, “The task for the Red Line Corridor Transit Study has been to identify potential modes and alignments, analyze each of these, and narrow them down to a reasonable number of alternatives for study in the AA/DEIS” (AA/DEIS, page 21).² The alignments eliminated in the screening process are shown in **Figure 4**.

² This approach is consistent with the Council on Environmental Quality’s (CEQ) guidance for determining the range of alternatives for detailed analysis in an EIS when the number of potential alternatives is very large or even infinite. As stated in the CEQ’s guidance, “When there are potentially a very large number of alternatives, only a reasonable number of examples, covering the full spectrum of alternatives, must be analyzed and compared in the EIS.” See CEQ, Forty Most Asked Questions Concerning CEQ’s National Environmental Policy Act Regulations, 46 Fed. Reg. 18026 (Mar. 23, 1981), response to Question 1b.

The alignments considered in the screening process consisted of alternative routes for BRT and/or LRT service within specific sections of the project study corridor. Within each geographic area, the alignments were considered in comparison to one another, based on their relative advantages and disadvantages. This comparative analysis resulted in identification of representative alignments within each geographic section of the project study corridor. These representative alignments were then combined into a series of “end-to-end” alternatives for detailed analysis in the AA/DEIS. The alignments retained for detailed study are shown in **Figure 5**.

The alternatives advanced for detailed study in the AA/DEIS were intended to serve as examples representing the full range of reasonable alternatives. As stated in the *2008 Alternatives Technical Report*, “other combinations of options may be combined, but due to the number of options under consideration, representative options had to be identified to manage the number analyzed.”

2.4.1 Red Line Extension to Bayview Feasibility Study

A feasibility study was conducted to investigate potential alignments and stations for an extension of a Red Line Transit project into the Bayview area, and to determine the compatibility of the extension alternatives with the potential future extension of the Red Line to Dundalk/Turners Station. The study focused on physical and operational feasibility. The study did not make a case for whether or when an extension to Bayview is merited, only how it might be accomplished. Refer to **Appendix E** for a copy of the Bayview Feasibility Study and refer to **Appendix F** for a summary of the report in the 2008 Alternatives Technical Report.

2.4.2 Consideration of Heavy Rail

The MTA has considered heavy rail transit, or Metro, throughout multiple stages in the project due to continued public interest. Heavy rail transit must be physically separated from its surrounding environment because of its power source, the electrified third rail. For the Red Line corridor, heavy rail would require significant tunnels or bridges for total separation from the surrounding environment, since at-grade rights-of-way do not generally exist except at I-70 and US 40 east of the West Baltimore MARC.

MTA conducted additional analysis of heavy rail during the screening process, and confirmed that it did not warrant detailed study because it was too costly and could not meet the cost-effectiveness requirements for New Starts funding. Two specific heavy rail alternatives were proposed by members of the public during this stage and were discussed in Chapter 2, page 29, of the AA/DEIS.

The first of the two alternatives was a full Heavy Rail Alternative from the Social Security Administration (SSA) to Greektown, 14.3 miles. This alternative was estimated to cost \$2.383 billion in 2007 dollars. The alternative was not carried forward through full analysis in the AA/DEIS because of its high capital cost as compared to LRT and BRT alternatives being studied. The Preferred Alternative for the Red Line in the FEIS has a cost of \$2.575 billion in year-of-expenditure dollars. The year-of-expenditure dollars are based on a schedule that has the Red Line opening in 2021 and escalation occurring at a rate of +3.1 percent per year. Escalating the previously studied Heavy Rail Alternative capital cost at the same rate that is being used for the

Preferred Alternative, with a project opening in 2021 and a mid-point of construction in the year 2018, yields a year-of-expenditure capital cost of \$3.334 billion. This cost estimate for heavy rail is \$759 Million higher than the Preferred Alternative. This 30 percent cost differential still renders the Heavy Rail Alternative as too costly when compared with the Preferred Alternative. In addition, there are other aspects of this proposed Heavy Rail Alternative that could bring into question its feasibility, could lead to higher capital costs, or create environmental impacts that would need to be addressed with associated costs, if the alternative were to be studied more thoroughly. These include constructing adjacent to the Amtrak Northeast corridor and within Amtrak right-of-way, construction to make connections with the existing Metro and the need to shut down Metro service while that construction occurred, likely 6 to 9 months at a minimum; additional property takes along Amtrak right-of-way; visual impacts of aerial alignment from Orangeville to Greektown; potential impacts from being in a tunnel under Leakin Park because of associated ventilation or emergency egress that may be required; and viability of an at-grade alignment along I-70. For additional details on the analysis of this heavy rail alternative refer to **Appendix G** of this technical report.

The second of the two alternatives was not a full Heavy Rail Alternative, but a combination of three modes – heavy rail, light rail, and streetcar. The heavy rail component extended the existing Metro from Johns Hopkins Hospital to the Bayview Medical Center. From CMS to the western portion of downtown, the Alternative would be light rail similar to the Preferred Alternative. Upon entering downtown, the light rail would be surface to Camden Yards, and then would be located in a tunnel to the existing Charles Center Metro Station. The third component would be a streetcar from Camden Yards to with surface operations along Pratt Street and through Harbor East, Fell's Point, Canton, Canton Crossing, and Haven Street to the Amtrak right-of-way, ending at Edison Highway. The streetcar alternative would run in mixed traffic along the surface. This alternative was estimated to have a capital cost of \$1.8 billion in 2007 dollars. Escalated at 3.1 percent per year yields a cost of \$2.518 billion in year-of-expenditure dollars. This cost is comparable to the Preferred Alternative, just as it was similar to the costs of the light rail and bus rapid transit alternatives in the AA/DEIS. The reasons this alternative were not studied further in the AA/DEIS are:

- Many east-west trips through the corridor would require transfers because of the multiple modes, increasing transit travel time and decreasing ridership.
- All of the streetcar components require sharing lanes with traffic, which degrades both vehicular traffic movements, as well as transit travel times, and would reduce ridership.
- Introducing a new mode, streetcar, requires an additional new maintenance facility for streetcars and introduces a new mode of transit to Baltimore, which does not improve transit efficiency.

For additional information refer to page 29 of the AA/DEIS.

2.5 Alternatives Evaluated in Detail in the AA/DEIS

The screening process resulted in identification of four overall alternatives for detailed study in the AA/DEIS, these four alternatives which were described in detail in Chapter 2 of the AA/DEIS (pages 30-40) and are summarized below.

- Alternative 1: No-Build
- Alternative 2: Transportation Systems Management (TSM)
- Alternative 3: Bus Rapid Transit (BRT)
- Alternative 4: Light Rail Transit (LRT)

2.5.1 Alternative 1 (No-Build)

The No-Build Alternative represents the future conditions of transportation facilities and services if the Red Line is not built. The No-Build Alternative did not meet the Purpose and Need, but was advanced for detailed study, as required by NEPA. It provides a point of comparison for assessing the benefits and impacts of the other detailed-study alternatives.

2.5.2 Alternative 2 (TSM)

The TSM Alternative represents transit improvements that can be implemented for mobility in the project study corridor without constructing a new transit guideway. This alternative emphasizes upgrades to existing transit service through operational and minor physical improvements. It could also include selected street upgrades, such as intersection improvements, minor widenings, and other focused traffic engineering solutions. The TSM Alternative also did not meet the Purpose and Need, but was advanced for detailed study in the AA/DEIS because consideration of a TSM Alternative is required by FTA as part of an Alternatives Analysis under the New Starts program.

2.5.3 Alternative 3 (BRT)

The AA/DEIS considered six representative combinations of alignments for the BRT alternative:

- Alternative 3A – BRT, dedicated surface
- Alternative 3B – BRT, downtown tunnel + dedicated surface
- Alternative 3C – BRT, downtown tunnel + Cooks Lane tunnel + dedicated surface
- Alternative 3D – BRT, maximum tunnel + dedicated surface
- Alternative 3E – BRT, dedicated surface with Johnnycake Road alignment
- Alternative 3F – BRT, shared and dedicated surface + downtown tunnel

2.5.4 Alternative 4 (LRT)

The AA/DEIS considered four representative combinations of alignments for the LRT alternative:

- Alternative 4A – LRT, dedicated surface
- Alternative 4B – LRT, downtown tunnel + dedicated surface

- Alternative 4C – LRT, downtown tunnel + Cooks Lane tunnel + dedicated surface
- Alternative 4D – LRT, maximum tunnel + dedicated surface

The AA/DEIS analyzed these ten alternatives in depth for transportation benefits, environmental effects, costs, and possible trade-offs. The trade-offs comparison of the alternatives are summarized in Table 6-4 in the AA/DEIS, which compares the ten alternatives based on 22 evaluation measures. The measures were grouped into three broad categories: cost and cost-effectiveness; transportation and connectivity; and equity, economic, and environmental.

The AA/DEIS provided information about the trade-offs among the alternatives, but did not identify a preferred alternative. The public, stakeholders, and regulatory agencies had a 90-day comment period between October 3, 2008 and January 5, 2009 on the document. A total of 729 comments, including six petitions, were received on the AA/DEIS. The majority of the comments stated either support for Alternative 4C or concerns about surface transit on Edmondson Avenue and Boston Street. Refer to Chapter 9 of the FEIS for additional information on the comments received on the AA/DEIS, and responses to those comments.

3. Identification and Refinement of the Locally Preferred Alternative

The FTA New Starts Process requires the local project sponsor to identify a Locally Preferred Alternative (LPA) as part of the application to enter into Preliminary Engineering. In August 2009, the State of Maryland, with consensus from Baltimore City and Baltimore County governments, announced an LPA that was similar to Alternative 4C as presented in the AA/DEIS document, but included several modifications to address public comments, to optimize cost effectiveness, and to meet engineering and transit operation requirements. Refer to **Figure 6**. The LPA as announced in August 2009 included the following refinements to Alternative 4C:

- Eliminated a station between Security Square Mall Station and SSA
- Shifted the entrance to the downtown tunnel at MLK Jr. Boulevard south of the Poppleton Station
- Eliminated a station between the Poppleton Station and the Howard Street/University Center Station
- Refined the downtown tunnel alignment to continue under Fleet Street instead of shifting underneath Aliceanna Street

3.1 Rationale for Selecting the LPA

In selecting an LPA based on Alternative 4C, the State made two important decisions: selecting LRT as the mode for the project; and selecting an alignment that includes surface-running transit for most of the length of the project, with the exception of a tunnel segment under Cooks Lane and a tunnel segment downtown. The State's reasons for selecting the LPA are summarized below. The data used in this analysis was taken from Chapter 6: Evaluation of Alternatives in the AA/DEIS. Refer to Table 6-4: Evaluation of Alternatives Matrix (page 118). The analysis compared LRT and BRT alternatives and specifically analyzed the differences between Alternative 4C and Alternative 3C. Alternative 3C had the same alignment as Alternative 4C; the only difference was that 3C was BRT and 4C was LRT.

3.2 Selecting LRT as the mode for the LPA

LRT had higher projected ridership – For the Red Line, LRT alternatives had consistently higher projected ridership than BRT alternatives. All of the LRT alternatives had higher projected ridership than the corresponding BRT alternatives – i.e., those with similar amounts of tunnel and at-grade sections. In the AA/DEIS, LRT Alternative 4C had a projected daily ridership of 42,100. The corresponding BRT Alternative 3C had a projected ridership of 37,400.

LRT had faster travel times than BRT – All of the LRT alternatives had a faster projected travel time than the corresponding BRT alternatives. In the AA/DEIS, Alternative 4C had an end-to-end travel time of 41 minutes, while the corresponding BRT Alternative 3C had a projected end-to-end travel time of 53 minutes.

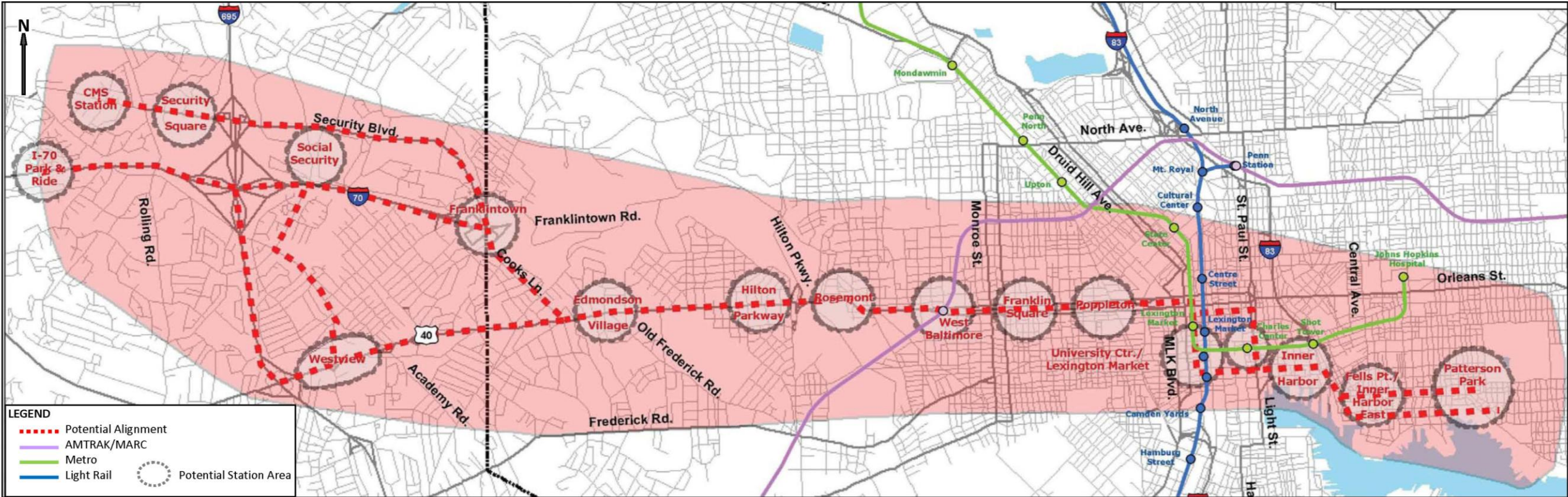


Figure 3: Alternatives Considered in the Scoping Report (2004)

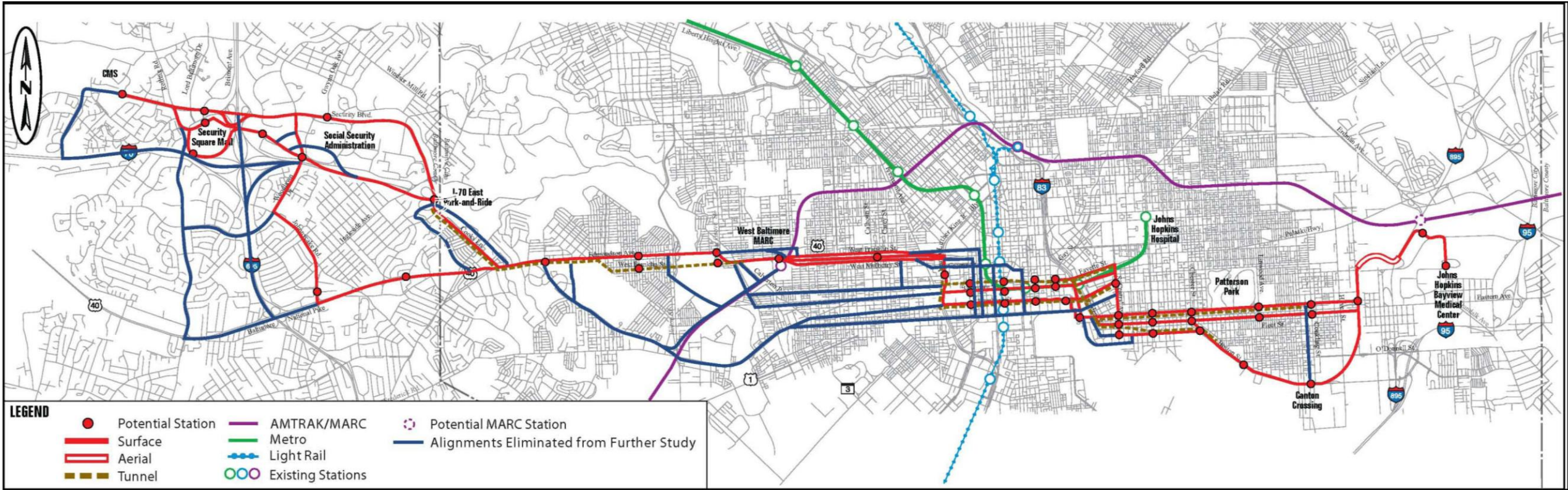


Figure 4: Screening of Preliminary Alternatives (2005-2007)

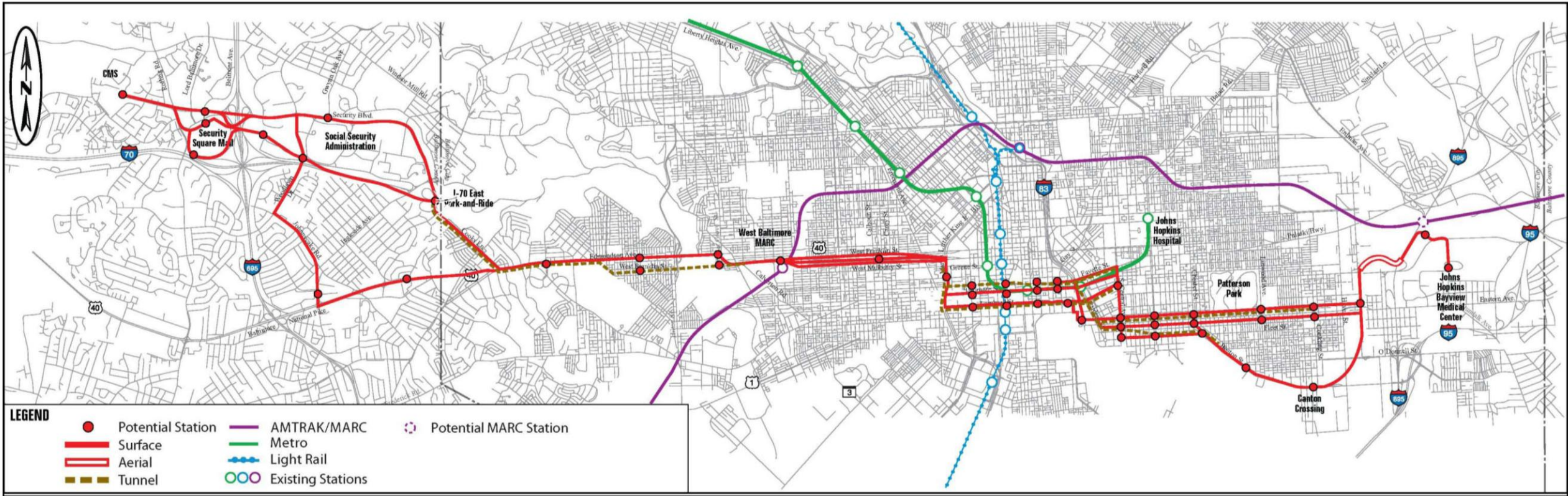


Figure 5: Alternatives Retained for Detailed Study in AA/DEIS (2008)

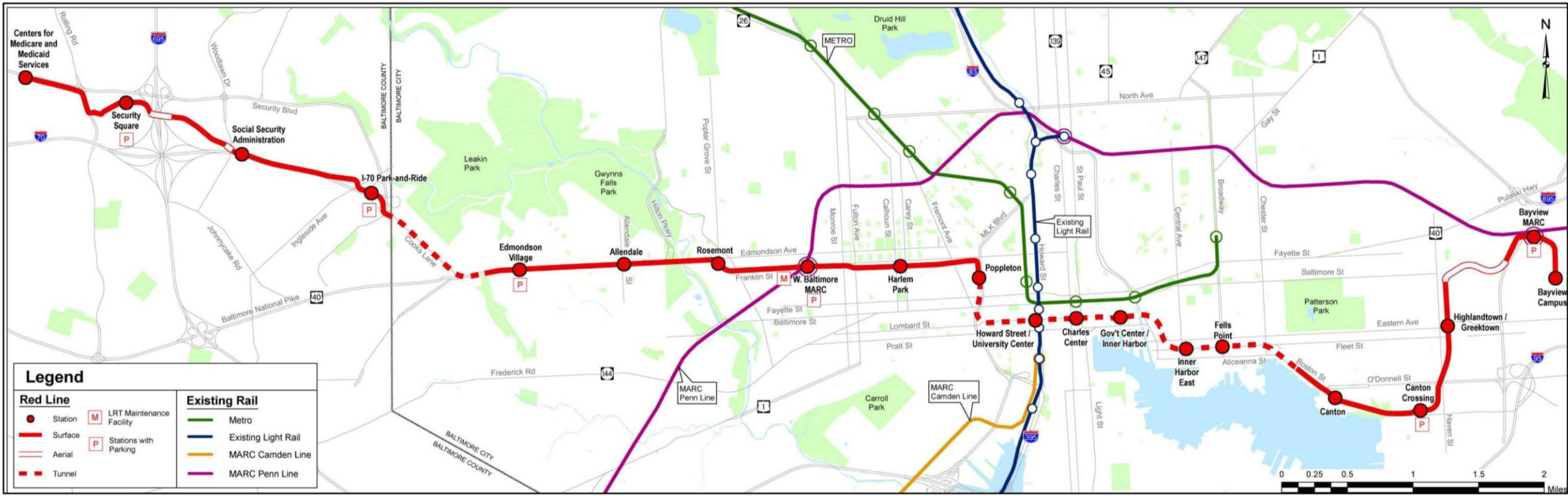


Figure 6: Locally Preferred Alternative (2009)

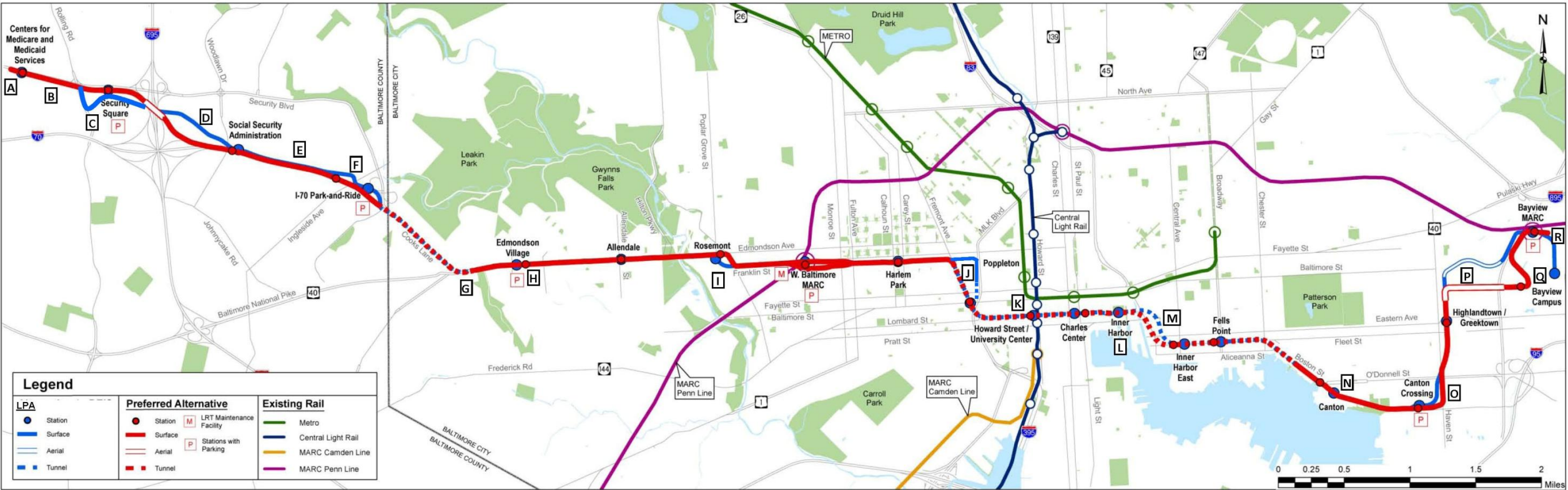


Figure 7: Refinements to the LPA (2009-2010)



Figure 8: Preferred Alternative (2012)

Strong public support for LRT and virtually no public support for BRT – Of the approximately 729 individual comments received on the AA/DEIS, approximately 400 individuals supported some form of a transit improvement in the project study corridor. One hundred and forty (140) individuals specifically supported LRT Alternative 4C, 28 supported another LRT alternative, and only seven people expressed support for any of the BRT alternatives. The remainder of the transit supporters did not specify LRT or BRT.

In addition to comments from the general public, leadership throughout the region expressed support for LRT. LRT supporters included Baltimore City Mayor Sheila Dixon, Baltimore County Executive Jim Smith, the Greater Baltimore Committee and other leaders of the business community, major institutions such as University of Maryland professional schools and hospital, Johns Hopkins medical institution, Baltimore City Community College, and non-profit organizations such as the Chesapeake Bay Foundation and the Citizens Planning Housing Association.

Cost-effectiveness better for LRT Alternatives than for BRT alternatives, under FTA criteria – The key criterion for obtaining New Starts funds from FTA for a transit project is the FTA cost-effectiveness rating. Cost-effectiveness is measured in cost per passenger mile, and is a comparison of the capital and operating cost of the transit improvement to the projected user benefit. A lower cost per passenger mile contributes to a better FTA rating. The cost per passenger mile for Alternative 4C was \$31.98 in the AA/DEIS, while the cost per passenger mile was \$49.06 for BRT Alternative 3C.

User benefit was higher for LRT than BRT – This evaluation measure looks at the number of hours of user benefits per day. All of the LRT alternatives had a higher annual user benefit than the corresponding BRT alternatives. For example, in the AA/DEIS, Alternative 4C had an annual user benefit of more than 4 million hours, whereas Alternative 3C's annual user benefit was 2.4 million hours.

LRT attracts more new transit riders than BRT – All of the LRT alternatives attract more new transit riders than the corresponding BRT alternatives. For Alternative 4C, 12,720 more transit riders per day were projected compared to 7,100 more transit riders per day with Alternative 3C, and 4,000 with the TSM Alternative were projected.

The No-Build and TSM Alternatives did not meet the Purpose and Need – The No-Build Alternative does not improve transportation conditions and therefore does not meet the Purpose and Need for the project. The TSM Alternative provides some transportation benefit, but it also does not meet the Purpose and Need for the project. The TSM Alternative was only marginally better than the No-Build Alternative in improving travel times (a savings of four minutes). Also, since the buses under the TSM Alternative would still operate in shared traffic lanes, the TSM Alternative would have done little to improve the mobility in the project study corridor. The TSM Alternative would carry significantly fewer riders than the other build alternatives, even though the operating costs are similar to (and in some cases higher than) the operating costs for the other build alternatives. Thus, the other build alternatives are more cost-effective than the TSM Alternative.

3.3 Selecting Alternative 4C as the LRT alignment for the LPA

In selecting an LRT alternative for the project study corridor, the most important considerations involved the locations and lengths of tunnel alignment. Alternative 4A included an all surface alignment with no tunnel alignments. Alternative 4B included surface alignments and a downtown tunnel alignment. Alternative 4C included surface alignments and Cooks Lane and downtown tunnel alignments. Alternative 4D included surface alignments, a tunnel alignment under Cooks Lane, tunnel alignment under US 40 from Cooks Lane to Longwood Street, and a tunnel extending under downtown and along Eastern Avenue to the Norfolk-Southern railroad right-of-way. The Red Line LPA, like Alternative 4C, included two tunnel segments: one tunnel would extend under Cooks Lane, and the Downtown Tunnel would extend from MLK Jr. Boulevard to Boston Street.

Cooks Lane Tunnel

Cooks Lane is currently a two-lane residential street with one-lane in each direction and on-street parking, as shown in the photograph on the right. In addition to the residential street character of Cooks Lane, the roadway is hilly with numerous grade-changes over the approximate one mile roadway.

The Cooks Lane alignment was selected as part of the LPA because it most directly serves major activity centers such as the SSA, Security Square Mall, and CMS.



Existing Cooks Lane

A tunnel was selected for Cooks Lane because there was not a viable surface transit option. A surface alignment was not viable primarily because it would have been incompatible with the residential character of Cooks Lane. As noted, Cooks Lane is a residential street with one travel lane in each direction plus parking. It is essential to maintain each of the travel lanes for access to the adjacent residences, and all surface options would have eliminated one on-street parking lane. More than 100 parking spaces would be eliminated with the loss of one parking lane on Cooks Lane, where off-street parking is limited for residents. In addition the grade of Cooks Lane would result in slower operation of the light rail vehicles. The surface alignments would result in travel times that were two minutes longer than a tunnel alignment on Cooks Lane. Taking these factors into account, the MTA concluded that a tunnel was required along the Cooks Lane alignment.

Downtown Tunnel

The Downtown Tunnel extends from MLK Jr. Boulevard to Boston Street, approximately 3.4 miles, traveling beneath CBD and the residential neighborhoods of Little Italy, Fell's Point, and Canton.

Within the CBD, the downtown tunnel extends from MLK Jr. Boulevard to Central Avenue. This section of the project study corridor extends through the highly congested streets of downtown Baltimore. Due to the large number of cross streets, any surface alignment would have been required to stop at numerous intersections, resulting in slower transit travel times. Surface options analyzed in the AA/DEIS showed transit travel times of approximately 13 minutes, where as the transit travel time with the tunnel option was 5 minutes, a transit travel time savings of approximately 8 minutes. Surface options in the CBD, with associated crossing of major north-south streets and traffic lights would not only increase transit travel times, but would also add to the traffic congestion in this area. The tunnel option beneath the CBD avoided the impacts to traffic lanes and reduces congestion downtown. The tunnel option was selected through the CBD due to travel time savings and that it avoids at-grade crossing of transit with all major north-south streets downtown.

The downtown tunnel extends from the CBD eastward into the residential neighborhoods of Little Italy, Fell's Point and Canton from Central Avenue to Boston Street. A tunnel was selected in this area because of the lack of viable surface options. A surface alignment was not viable in this area for several reasons. As in the CBD, this portion of the corridor is highly congested and has multiple cross streets, which would result in slower transit travel times. In addition, the streets in the historic Fell's Point neighborhood have a narrow right-of-way with buildings located close to the edge of the street. A surface alignment would require over 200 on-street parking spaces between Central Avenue and Chester Street. Therefore, the tunnel continues through Fell's Point returning to the surface on Boston Street, where the roadway is wider and there is sufficient room to accommodate transit in the median.



Existing Fleet Street

Surface transit options in the Eastern Avenue/Fleet Street corridor were studied in the AA/DEIS. The surface options were not selected because the options either significantly reduced roadway capacity and affected access to residents and businesses, or resulted in a significant loss of on-street parking spaces where these residents have no off-street parking option. Therefore, the most benefit with the least amount of impact would be gained by tunneling from the CBD and Fell's Point to Canton.

3.4 Refinements to the LPA

Subsequent to the announcement of the LPA in August 2009, MTA has continued to refine the LPA. A summary of the refinements is presented in **Table 2**. The refinements were made based on: stakeholder input, station planning, and additional engineering, which resulted in reduced environmental impacts, reduced project costs, and improved safety. These refinements have been incorporated in the Preferred Alternative that is presented in this FEIS (refer to **Figure 8**

and **Figure 9**). These refinements were presented to the public at the Summer 2012 Public Open House Meetings held June 6th, 9th, 12th, and 16th, 2012. A more detailed explanation of refinements described west to east within the project study corridor follows **Table 2**.

In accordance with 23 CFR 771.129, the MTA prepared a reevaluation because more than three years had passed since publication of the AA/DEIS for this project. MTA submitted the reevaluation to FTA on August 16, 2012. The reevaluation compared the current Preferred Alternative as examined in the FEIS to the build alternatives considered in the AA/DEIS, and concluded that a Supplemental Environmental Impact Statement (EIS) of the AA/DEIS is not required because there are no new significant environmental impacts beyond those evaluated in the AA/DEIS. In correspondence dated September 17, 2012, FTA concurred with the findings in the reevaluation.

Table 2: Summary of Refinements to the LPA

Refinement	Criteria					Key to Figure 2-7
	Ridership/ Transit Operations	Environmental Factors	Public/ Stakeholder Input	Capital Costs	Constructability	
Security Boulevard						
Added tail track at west terminus	✓					A
Shifted alignment on Security Blvd at west end to stay within existing roadway		✓	✓			B
Modified alignment at Security Square Mall to continue along Security Blvd, as opposed to traversing Mall property	✓		✓	✓		C
I-70						
Modified alignment between Beltway and Woodlawn Drive, adjacent to ramp from I-70 to I-695	✓	✓	✓	✓		D
Shifted alignment to use portions of existing I-70	✓	✓	✓	✓	✓	E

Table 2: Summary of Refinements to the LPA

Refinement	Criteria					Key to Figure 2-7
	Ridership/ Transit Operations	Environmental Factors	Public/ Stakeholder Input	Capital Costs	Constructability	
New location for I-70 Park-and-Ride lot and Station		✓	✓	✓		F
<i>Cooks Lane</i>						
Shifted Cooks Lane tunnel portal 400 feet east on Edmondson Avenue		✓			✓	G
<i>US 40</i>						
Shifted Edmondson Village Station to mid block between Swann and Athol Avenues			✓			H
Shifted Rosemont Station and alignment from US 40 to Edmondson Avenue and Franklinton Road	✓	✓	✓			I
<i>Downtown Tunnel</i>						
Downtown tunnel alignment shifted from MLK Jr. Blvd to Fremont Avenue; Poppleton station placed underground and further south	✓	✓	✓		✓	J
Shifted Howard Street Station to east of Howard Street				✓	✓	K
Eliminated Government Center/ Inner Harbor Station				✓		L
Shifted tunnel alignment to under President Street		✓	✓	✓	✓	M

Table 2: Summary of Refinements to the LPA

Refinement	Criteria					Key to Figure 2-7
	Ridership/ Transit Operations	Environmental Factors	Public/ Stakeholder Input	Capital Costs	Constructability	
Lowered tunnel depth for downtown tunnel		✓			✓	Not shown
Eliminated underground crossover				✓		Not shown
<i>Boston Street</i>						
Shifted Canton Station to west of Lakewood Ave	✓		✓			N
Shifted alignment near Boston and Haven Streets			✓			O
<i>Bayview Campus Area</i>						
New location for bridge over CSX and I-895	✓		✓	✓	✓	P
New alignment and station location on Bayview Campus	✓		✓	✓		Q
Added tail track at eastern terminus	✓					R

3.4.1 Security Boulevard from Western Terminus to Security Square Mall

With the LPA, the alignment was located on south side of Security Boulevard and then turned south along the west side of Rolling Road. At the intersection of Rolling Road/Rolling Bend Road, the alignment turned east following Rolling Bend Road on the north side until reaching a reconstructed portion of the mall loop road. The dedicated alignment and station with parking was inside the reconstructed portion of the mall loop road. The alignment crossed the mall loop road at-grade before rising over I-695 on structure.

At the western terminus, the Preferred Alternative alignment includes a 380-foot “tail track”. Tail track is an additional section of track at the terminus of the project, and is added for operational flexibility. This extension would be required for all LRT alternatives previously shown in the AA/DEIS.

The Preferred Alternative alignment was shifted to the north to maintain some vegetative buffer between the residences, the Red Line and Security Boulevard. The alignment now continues west adjacent to the south side of Security Boulevard through the Rolling Road intersection and along the north edge of the Security Square Mall property. This alignment shift reduces the impacts to businesses along Security Boulevard and the mall property.

The Security Mall station was shifted to the west between Lord Baltimore Drive and Belmont Avenue at the request of community input to have the station closer to residential areas and existing bus stops, but still adjacent to the Mall.

3.4.2 I-70 Area from I-695 to Cooks Lane

From the Security Square Mall area the LPA alignment continued to the east in a strip of land between the mall parking lot and the interchange ramp to I-695, crossing over the beltway and traversing through the SSA's West Campus parking lot, continuing east through a strip of forested land between Parallel Drive and the I-70 westbound lanes to the I-70 park and ride lot that was proposed in the northwest quadrant of the I-70/Security Boulevard interchange.

During ACD continued coordination with the State Highway Administration (SHA), Baltimore County, SSA, and the communities resulted in some refinements to the alignment adjacent to I-70. The proposed Red Line bridge crossing I-695 was refined to accommodate future widening of I-695. On the SSA West Campus the alignment was refined to follow the I-70/I-695 ramp. This avoided the Red Line crossing the entrance road to the SSA West Campus. After coordination with SHA, the Red Line alignment transitions to the excess pavement of I-70 sooner than the LPA alignment in order to take advantage of the existing underutilized pavement of I-70 for the track bed for the Red Line and to reduce impacts to forests and streams.

The Preferred Alternative alignment continues on existing westbound I-70 and uses the existing structure over Woodlawn Drive. In the Preferred Alternative alignment, the I-70 Park-and-Ride station was relocated from the northwest quadrant of the I-70/Security Boulevard interchange to west of Ingleside Avenue. This change was made because the previous location would require significant excavation to create the parking area, while the current proposed location has less topography relief to overcome. The LPA alignment would have also required low-speed curves and street grade crossings, while the current Preferred Alternative alignment enables a faster travel time through the area and more parking spaces at full build out of the station. The Preferred Alternative includes I-70 being reconfigured to transition from an interstate at I-695 to a 40 mph boulevard. Intersection and roadway improvements would be required on Security Boulevard, Ingleside Avenue, and Parallel Drive. The Preferred Alternative alignment utilizes the existing structure over Ingleside Drive and continues south of I-70.

The Preferred Alternative includes a re-configuration of the I-70 roadway between I-695 and Security Boulevard/Cooks Lane. The reconfiguration of I-70 includes three connections. These connections are with Parallel Drive, the proposed I-70 Park-and-Ride Station, and a new re-configured signalized intersection at the end of I-70 with Security Boulevard, Cooks Lane, and Forest Park Avenue. The reconfiguration of I-70 and the new connections would alter the traffic

flows that exist today, but all traffic movements would be able to be maintained that exist today. The existing partial interchange of I-70 and Security Boulevard would no longer operate.

I-70 would continue as a Federal-Aid roadway under the responsibility of SHA. Immediately inside I-695, I-70 would have three lanes eastbound (inbound) and three lanes westbound (outbound). In the inbound direction, a double left turn lane would be provided at a new connection with Parallel Drive. This connection would allow for inbound traffic to access Parallel Drive and the SSA. The connection between I-70 and Parallel Drive would allow vehicular movements in either direction on Parallel Drive, either towards SSA or towards Ingleside Avenue. One lane would continue inbound to a new signalized intersection with Security Boulevard/Cooks Lane/Forest Park Avenue. In the outbound direction, one lane would be provided westbound from the signalized intersection of Security Boulevard/Cooks Lane/Forest Park Avenue. A second lane would be added at an egress from the Red Line I-70 Station and a third outbound lane will be added at the new connection from Parallel Drive.

From the I-70 Park-and-Ride Station, access and egress would be provided at two separate entrances/exits along Parallel Drive. There would also be an egress-only exit provided from the I-70 Park-and-Ride Station onto I-70 westbound.

A new four legged signalized intersection would be provided between the end of I-70, and Security Boulevard, Cooks Lane, and Forest Park Avenue. All turning movements and through movements would be allowed at this new intersection. Access to I-70 would be from a right turn lane from Security Boulevard, a through lane from Cooks Lane, and a left turn lane from Forest Park Avenue. A double left turn would be provided from the end of I-70 to Security Boulevard, a through lane would be provide from I-70 to Cooks Lane, and a right turn lane would be provided from I-70 to Forest Park Avenue. The vehicular movement that exists today between Security Boulevard and Cooks Lane would still be provided. However, as opposed to a through movement, vehicles from Cooks Lane to Security Boulevard would utilize a free right turn lane and vehicles travelling from Security Boulevard would utilize a left turn lane from Security Boulevard to Cooks Lane. All other movements between each leg of the intersection would also be provided.

3.4.3 Cooks Lane Tunnel

Like the LPA, the Preferred Alternative alignment is also under Cooks Lane; however, the eastern portal on Edmondson Avenue was shifted within the median further east. The shift to the east was approximately 400 feet and was done to lower the vertical alignment of the tunnel under the residences on the corner of US 40 and Cooks Lane. This change in profile allows for the tunnel crown to be maintained in solid bedrock and is a refinement based on additional geological data obtained since the AA/DEIS.

3.4.4 US 40 from Cooks Lane to West Baltimore MARC Station

The LPA alignment and the Preferred Alternative alignment in the median of US 40 are the same as Alternative 4C in the AA/DEIS. The Edmondson Village station was relocated to mid-block between Swann Avenue and Athol Avenue based on input from the community as part of the ongoing public involvement process. The community strongly supported the station

location in this location based on its service to both intersecting roadways, the reduction in congestion around Swann Avenue, and its effect as a natural barrier to pedestrian crossings. This location also maintains service to the existing commercial development and the planned Uplands Community.

The LPA alignment reflected the Rosemont Station on Franklin Street as the Red Line alignment followed the existing traffic flow of the US 40 corridor. Under the current Preferred Alternative alignment, the Rosemont Station would be located on Edmondson Avenue between Poplar Grove Street and North Franklinton Road. The station location was relocated to Edmondson Avenue to improve the sight distance and pedestrian safety by increasing the visibility of the platform and removing it from the existing higher speed traffic flow. As a result, the Red Line alignment would continue along Edmondson Avenue to Franklinton Road and then turn east back into the median of US 40/Franklin Street. This section of Edmondson Avenue was evaluated as part of the AA/DEIS, but did not include the alignment on North Franklinton Road. Additional community outreach was undertaken to present this refinement of the alternative and the community has supported the station relocation.

3.4.5 Downtown Tunnel

a. Fremont Tunnel Alignment

The LPA alignment for the western portal to the downtown tunnel section included a number of surface treatments and tunneling techniques. At that time, the Red Line tracks would transition from surface running in the median of US 40 at the North Schroeder Street overpass and begin to descend with respect to the US 40 roadway. Once the Red Line reached the MLK Jr. Boulevard the Red Line tracks would traverse a curve to clear under the eastbound US 40 overpass. Upon clearing the overpass abutment, the tracks would cross at-grade with West Mulberry Street and continue along the west side of MLK Jr. Boulevard.

The tracks would continue south across West Saratoga Street and into the surface Poppleton Station. Upon departing the station, the tracks would descend into a portal area, which would include the two tracks with varying height retaining walls on either side until the tracks entered into a tunnel structure.

The tunnel would continue alongside MLK Jr. Boulevard and then curve underneath MLK Jr. Boulevard and the Old St. Paul's Cemetery. The radius of this curve was approximately 400 feet. Due to the tight curvature, two methods of tunnel construction were proposed. The first method involved cut-and-cover construction adjacent to and underneath MLK Jr. Boulevard. This technique would have required the relocation of existing utilities (one of which is a deep large storm sewer); installation of roadway decking; multiple maintenance of traffic stages; and construction of the permanent tunnel structure. The second method included tunneling underneath MLK Jr. Boulevard and Old St. Paul's Cemetery by Sequential Excavation Method (SEM). In this method, the ground is first supported from a tunneling "face" and sequentially excavated. It can be a slow process and requires initial ground support. Due to the existing soil conditions present at this location and depth of the proposed tunnels, ground freezing was considered to be the selected method of initial ground support. At the end of the SEM tunnels,

the alignment would be located beneath West Lombard Street near the intersection with Penn Street. At this point, tunnel excavation by tunnel boring machines (TBMs) could proceed. In order to commence TBM operation, “starter tunnels” would need to be mined to assemble and launch each TBM. These starter tunnels were planned to be mined by SEM and incorporated at the end of the SEM tunnels underneath the cemetery.

As an alternative to the complexities described above, a proposal was made to shift the alignment away from MLK Jr. Boulevard and locate the tunnels underneath Fremont Avenue. By doing so, the radius connecting Fremont Avenue to West Lombard Street could be increase to 650 feet thereby allowing tunnel construction by TBM. This method eliminates the utility relocation, roadway realignment on MLK Jr. Boulevard, decking, and cut-and-cover construction within MLK Jr. Boulevard and eliminates the SEM tunneling underneath Old St. Paul’s Cemetery.

In order to tunnel beneath Fremont Avenue, the transition between surface alignment and the tunnels had to be located in the median of US 40 in the vicinity of the North Schroeder Street overpass. The US 40 median will serve as the launching point of the TBMs and the construction staging area for the tunneling through the Downtown Section. A consequence of this alignment refinement is that the Poppleton Station is to be shifted southward and westward, and requires the station to be located underground.

The refined alignment provides for a simpler, more uniform method of tunneling. It avoids a significant construction impact in the Martin Luther King Jr. Blvd. area. It eliminates lengthy and difficult SEM mining and associated ground improvement beneath an historic cemetery. The option requires an additional underground station, but the station location is situated more centrally in the area and addresses a number of comments and suggestions by the Station Area Advisory Committee and adjacent University of Maryland concerns. The revised tunnel limits allows for the launching of the TBMs and the associated construction staging area to be located within the median of US 40, which provides for a larger staging area and a buffer to the surrounding residential community.

b. Howard Street Station

The LPA located the Howard Street Station on the west side of Lombard Street to provide a station entrance in close proximity to the Howard Street Central Light Rail Station recognizing the priority for connectivity between the two transit systems. Since the AA/DEIS, foundation plans for the Bromo Seltzer tower where obtained that showed the tall tower was supported on shallow spread footings. It was recognized that constructing the station box excavation adjacent to the tower foundations introduced significant risk in completing a costly underpinning of the entire building foundation system. Recognizing this risk, the Howard Street Station was moved from the west side of Howard Street to the east side with the Preferred Alternative.

c. Inner Harbor Station

The LPA included two underground stations along the east portion of the Lombard Street corridor. These two stations were the Charles Center Station and the Government Center/Inner

Harbor Station. A double crossover was proposed on the east side of the Government Center Station.

Since the AA/DEIS, a search was conducted for a suitable station entrance and ancillary facility building sites, and additional assessments were made relative to the ridership catchment area for each station. Given the developed nature of the downtown CBD area, which limited the number of suitable sites for locating the entrance and ancillary building facilities, it was determined that a single station could adequately service this portion of the downtown area. This single station located between Light Street and Calvert Street is referred to as the Inner Harbor Station. An underground pedestrian corridor connecting to the Charles Center Metro Station is still included as part of the Inner Harbor Station design under the Preferred Alternative.

After the AA/DEIS, the single track run times through the length of downtown tunnel were evaluated and it was determined that acceptable single track run times would occur between the crossovers outside the tunnel portals, thereby allowing for the elimination of the crossover that was included with the Government Center Station.

d. President Street Alignment

The LPA alignment located the Red Line tunnel beneath approximately 80 residences and other properties in the Little Italy Historic District. The Preferred Alternative alignment shifted the tunnel to the west under President Street. The LPA underneath Little Italy was based on the concern that foundation depths for a building located at the corner of Lombard Street and President Street were unknown. Based on review of the building design plans following the AA/DEIS, this was determined not to be an issue and allowed the realignment of the tunnel in this area. This refinement reduced the number of homes and businesses the tunnel would be under (including the historic district). Additionally, the tunnel under President Street places the tunnel foundations in rock instead of under the older homes and businesses founded on soils.

3.4.6 Boston Street and Haven Street to Norfolk Southern/ Canton Railroad

The LPA and the Preferred Alternative are generally the same in the section north of O'Donnell Street and utilize the in-active portion of the Norfolk-Southern Railroad. The Preferred Alternative alignment at the Exxon site near Haven Street was shifted to the east onto Haven Street to avoid pumping wells on this site. This information was identified through continued coordination with Exxon and Baltimore City since the AA/DEIS.

3.4.7 Norfolk Southern/Canton Railroad at Eastern Avenue to Bayview MARC Station

The LPA considered a curved aerial structure over the active freight rail yard and I-895. The Preferred Alternative alignment was refined to a straight aerial structure south of Lombard Street. This refinement results in a lower cost to the project and avoidance of the freight rail yard. Additionally, this enables the Bayview Campus station to be closer to the heart of the Johns Hopkins Bayview Medical Campus, as requested through ongoing coordination with Johns Hopkins University since the completion of the AA/DEIS. With the relocation of the

Bayview Campus station the Preferred Alternative alignment ends at the Bayview MARC Station, instead of looping back to Bayview Campus after reaching the MARC station. At the eastern terminus of the Preferred Alternative a 380-foot tail track was added beyond the Bayview MARC station for the purpose of operational flexibility. This would be required for any of the LRT alternatives previously shown in the AA/DEIS.

3.5 Additional Analysis in Response to the AA/DEIS Comments

During the public comment period for the AA/DEIS, the public expressed interest in three options that included more tunnel than was in the LPA. Two of these tunnel segments were included in the AA/DEIS. The first of these tunnel segments would extend the Cooks Lane tunnel east approximately two miles to US 40 at Calverton Road. The second tunnel segment extends the Downtown Tunnel under Eastern Avenue approximately one mile to Haven and Pratt Streets. The third tunnel segment was not included in the AA/DEIS. It would extend the Downtown Tunnel slightly less than one mile under Boston Street to Conkling Street.

For the Preferred Alternative in the FEIS, capital costs are expressed in year-of-expenditure dollars based on a project opening in 2021 and a mid-point of construction in 2018. For comparison purposes, the costs of the three tunnel options have been updated and calculated to year-of-expenditure dollars consistent with the Preferred Alternative. These year-of-expenditure dollars are used in the three options described below.

3.5.1 Extending Cooks Lane Tunnel to US 40 at Calverton Road

In the AA/DEIS, the MTA analyzed continuing the Cooks Lane tunnel under US 40/Edmondson Avenue further east to US 40 at Calverton Road. Based on the engineering drawings for the Preferred Alternative this would extend the tunnel from Station 181+50 to 73+50, a distance of 10,800 feet. The cost for the underground alignment is estimated to be \$296,539,078. The cost for a surface alignment for this same portion is estimated to be \$64,245,172. The extended tunnel would also require that three surface stations included in the Preferred Alternative be underground. These stations are Edmondson Village, Allendale, and Rosemont. Three surface stations would cost \$5,039,952 while three underground stations are estimated at \$296,258,636. The total net difference between underground and surface for this option is \$523,512,590 in year-of-expenditure dollars.

The Preferred Alternative is located on the surface (at-grade), generally within the median of US 40 between the Cooks Lane Tunnel portal and the West Baltimore MARC station. There is adequate right-of-way available to construct light rail in the median without the need to purchase or relocate any residential homes. As such, an underground alternative is not needed to preserve adjacent land uses. Also, the impact assessments for resources along US 40 indicate that a surface alternative is feasible in this area of the project. Therefore, the major reason that a tunnel alignment was not pursued between Cooks Lane and Calverton Road was cost.

3.5.2 Eastern Avenue Tunnel

In the AA/DEIS, the MTA analyzed continuing the Downtown tunnel under Eastern Avenue to the Norfolk Southern (NS) right-of-way just east of Haven Street. This tunnel option was part of

Alternative 4D. Based on the engineering drawings in the AA/DEIS and the current engineering drawings for the Preferred Alternative, this tunnel option would result in an extra 6,350 feet of tunnel for an estimated cost increase of \$176,197,299 and a reduction of 9,650 feet of surface alignment for a cost reduction of approximately \$55,805,950. The tunnel under Eastern Avenue would add three underground stations at Patterson Park West, Patterson Park East, and Highlandtown for an additional cost of approximately \$296,258,636 and reduction of three surface stations at Canton, Canton Crossing, and Highlandtown/Greektown for a reduction of approximately \$4,842,878. The total increase costs for an underground option under Eastern Avenue would be \$411,807,107.

The LPA and Preferred Alternative include a tunnel that turned from Fleet Street near Chester Street to underneath Boston Street to a portal near the intersection of Montford Avenue/Hudson Street. The AA/DEIS presented surface and tunnel alignments in the Eastern Avenue/Fleet Street Corridor as well as surface alignments in the Boston Street corridor.

A tunnel option was considered in the AA/DEIS under Eastern Avenue to the NS right-of-way. This tunnel option would cost an additional \$412 million than the Preferred Alternative in year-of-expenditure dollars resulting from the addition of 6,350 feet of tunnel and three underground stations.

Three surface options were considered in the AA/DEIS as an Eastern/Fleet Couplet. The three options differ in the hours of available parking and whether the streets have one-way or two-way traffic.

- 1) A surface option with one light rail track on each street, two traffic lanes on each street and part-time parking in the left curb lane. This option would maximize the traffic lanes, but result in the loss of approximately half of the parking, which was not considered viable.
- 2) A surface option with one light rail track on each street, parking maintained on one side of the street only and totally lost on the other side of the street, and two lanes of traffic, one lane in each direction. This option would result in the loss of one-half of the parking along Eastern Avenue and Fleet Street, which was considered not viable.
- 3) A surface option with one light rail track on each street, full-time parking on both sides of each street, and one-lane of traffic on each street. This option effectively makes both Eastern and Fleet streets one-way streets with one lane for traffic, but maximizes the amount of parking. This option was not selected due to traffic impacts and vehicular access impacts to residents and businesses along Eastern Avenue and Fleet Street.

(Refer to page 217 of the AA/DEIS for the typical sections of these three surface options on Eastern Avenue/Fleet Street.)

On Boston Street two surface options were considered: in the median of Boston Street or along the south side of Boston Street. The surface option along the south side of Boston Street was

not selected as it would impact access to residences and businesses and require additional right-of-way along the south side of Boston Street.

The other surface option on Boston Street includes light rail transit in the median. This option could operate with one or two lanes of traffic on Boston Street. Working with Baltimore City Government, the Preferred Alternative includes Boston Street with one-lane in each direction throughout the day. The City selected the one-lane option after analyzing all impacts and seeking input from the public. The Preferred Alternative on Boston Street does have impacts on traffic flow and number of parking spaces, but those impacts are not as severe as the impacts that would be created on Eastern Avenue and Fleet Street.

As documented in the AA/DEIS, alignments on Boston Street and Eastern Avenue would have similar overall ridership: the AA/DEIS projected 42,100 daily trips on Alternative 4C, which followed Boston Street, and 42,300 daily trips on Alternative 4D, which included tunnel under Eastern Avenue. But, viewed from the perspective of the purpose and need for the project, a Boston Street alignment was preferable to an alignment along Eastern Avenue, because it more directly connects to existing and planned major activity centers in the corridor.

In addition, an alignment along Boston Street would provide benefits even to residents who are not within a short walking distance of that alignment. Many residents of the Patterson Park and Highlandtown neighborhoods would be within walking distance of at least one Red Line station, such as the Fell's Point station. In addition, Eastern Avenue is currently served by numerous bus routes that connect to the proposed Red Line stations.

On balance, while Boston Street and Eastern Avenue alignments would provide different combinations of benefits, the Boston Street alignment overall is more consistent with the purpose and need of the project because it provides direct connection to the Canton area.

In a letter dated May 7, 2012, FTA and MTA received a report recommending additional consideration of light rail alternatives located on Eastern Avenue. Refer to b'more mobile, "The Case for Eastern Avenue on The Red Line" (May 2012) in **Appendix H** of this technical report. The report claimed that an Eastern Avenue route would serve more local users overall, and that it would better serve transit users in minority and low-income neighborhoods and therefore was more consistent with principles of environmental justice. FTA responded in a letter dated May 25, 2012, noting that environmental justice issues were being analyzed and would be addressed in the FEIS. In addition, MTA responded in a letter dated October 1, 2012 (refer to **Appendix H**). The MTA responses addressed the specific issues raised in the report in more detail and reaffirmed MTA's preference for the Boston Street alignment. The MTA cited several reasons, including: (1) the Boston Street alignment is more consistent with the project's purpose and need because it provides a direct connection to the Canton area; (2) the proposed alignment along Boston Street is consistent with environmental justice requirements; and (3) the cost and impact of an Eastern Avenue route, whether surface or tunnel, would be substantially greater than estimated in the b'more mobile report. FTA has reviewed MTA's response to the b'more mobile report and concurs with MTA's response.

3.5.3 Extending the Downtown Tunnel under Boston Street

For alternatives that included a Downtown Tunnel in the AA/DEIS, there were several alternative locations identified for portals at the eastern end of the tunnel. These included Central Avenue, Aliceanna Street near Boston Street, and Boston Street near Hudson Street. The Preferred Alternative has a tunnel portal on Boston Street near Hudson Street. During the AA/DEIS public comment period, a number of comments were received to extend the tunnel under Boston Street further east under Boston Street. A cost estimate was prepared to extend the tunnel to a location near Conkling Street. This extension would extend from station 174+50 to 222+00, a distance of 4,750 feet. The additional cost in year-or-expenditure dollars for this additional tunnel length is \$140,766,750. The cost for surface alignment for this same distance is \$28,255,978. The extended tunnel would require that one station, Canton, be underground as opposed to surface. These costs are \$98,752,879 for an underground station and \$1,397,126 for a surface station. The total additional cost for extending the Downtown Tunnel to Conkling Street is \$209,866,525.

There is adequate right-of-way available to construct light rail in the median of Boston Street without the need to purchase or relocate any residential homes or businesses. As such, an underground alternative is not needed to preserve adjacent land use. Also, the impact assessments for resources along Boston Street indicate that a surface alternative is feasible in this area of the project. The major reason that an extended tunnel alignment was not pursued along Boston Street was cost. In order to design and construct that portion of the project underground, the cost of the project would increase by approximately \$210 million, in year-of-expenditure dollars.

4. Preferred Alternative Alignment

The following text describes the horizontal and vertical elements of the Preferred Alternative alignment. For additional details on the stations, park-and-ride facilities, system elements, tunnel ventilation, light rail vehicles, operation and maintenance facility, and rail and bus operations plans for the Preferred Alternative, refer to Chapter 2 of the FEIS.

For presentation purposes, the project study corridor has been divided into five segments consisting of three at-grade/aerial segments and two tunnel segments totaling approximately 14.1 miles. From west to east, these segments are: (1) West, (2) Cooks Lane Tunnel, (3) US 40, (4) Downtown Tunnel, and (5) East. Refer to **Figure 9**. These segments have been identified for analysis purposes only; they are not intended to correspond to construction phases or construction contracts, nor do they represent project with independent utility.

4.1 West Segment (2.9 miles)

The west segment begins in Baltimore County at the CMS Station, a center-platform station, located west of Rolling Road on the south side of Security Boulevard. At the western end of the Preferred Alternative, 380 feet of tail track would be provided beyond the station for the purpose of operation flexibility. The Preferred Alternative would continue east in an exclusive right-of-way adjacent to the south side of Security Boulevard. The Preferred Alternative would continue east with at-grade crossings at Greengage Road, Brookdale Road, Boulevard Place Shopping Center entrance, and Rolling Road. From Rolling Road, the Preferred Alternative would run adjacent and parallel to the south side of Security Boulevard and along the northern boundary of Security Square Mall crossing Lord Baltimore Drive at-grade. The Preferred Alternative would continue to the center platform Security Square Station located immediately west of Belmont Avenue. A park-and-ride lot is proposed at this station and at full development would have 325-375 parking spaces.

The Preferred Alternative would extend east across Belmont Avenue at-grade to the west side of I-695 (Baltimore Beltway), continuing southeast and crossing the interchange diagonally on an aerial structure over I-695. The Preferred Alternative would continue adjacent to the existing parking lots at the SSA west campus and along the north side of the I-70 ramp to I-695. The Preferred Alternative would continue east transitioning onto the existing excess pavement of westbound I-70, just west of Woodlawn Drive, to the center platform SSA Station just east of Woodlawn Drive.

Continuing east, the Preferred Alternative would cross at-grade with a roadway connection from I-70 to Parallel Drive and continues on the former roadway pavement to the I-70 Park-and-Ride Station. The station and park-and-ride facility are located west of Ingleside Avenue occupying the on-ramps to the former westbound I-70. Initially, the I-70 Park-and-Ride lot would have 650-700 parking spaces with the opportunity for expansion in the future.

Continuing east of the I-70 Park-and-Ride Station, the Preferred Alternative would cross over Ingleside Avenue on an existing bridge and curves in a southeast direction to the tunnel portal for the Cooks Lane Tunnel segment.

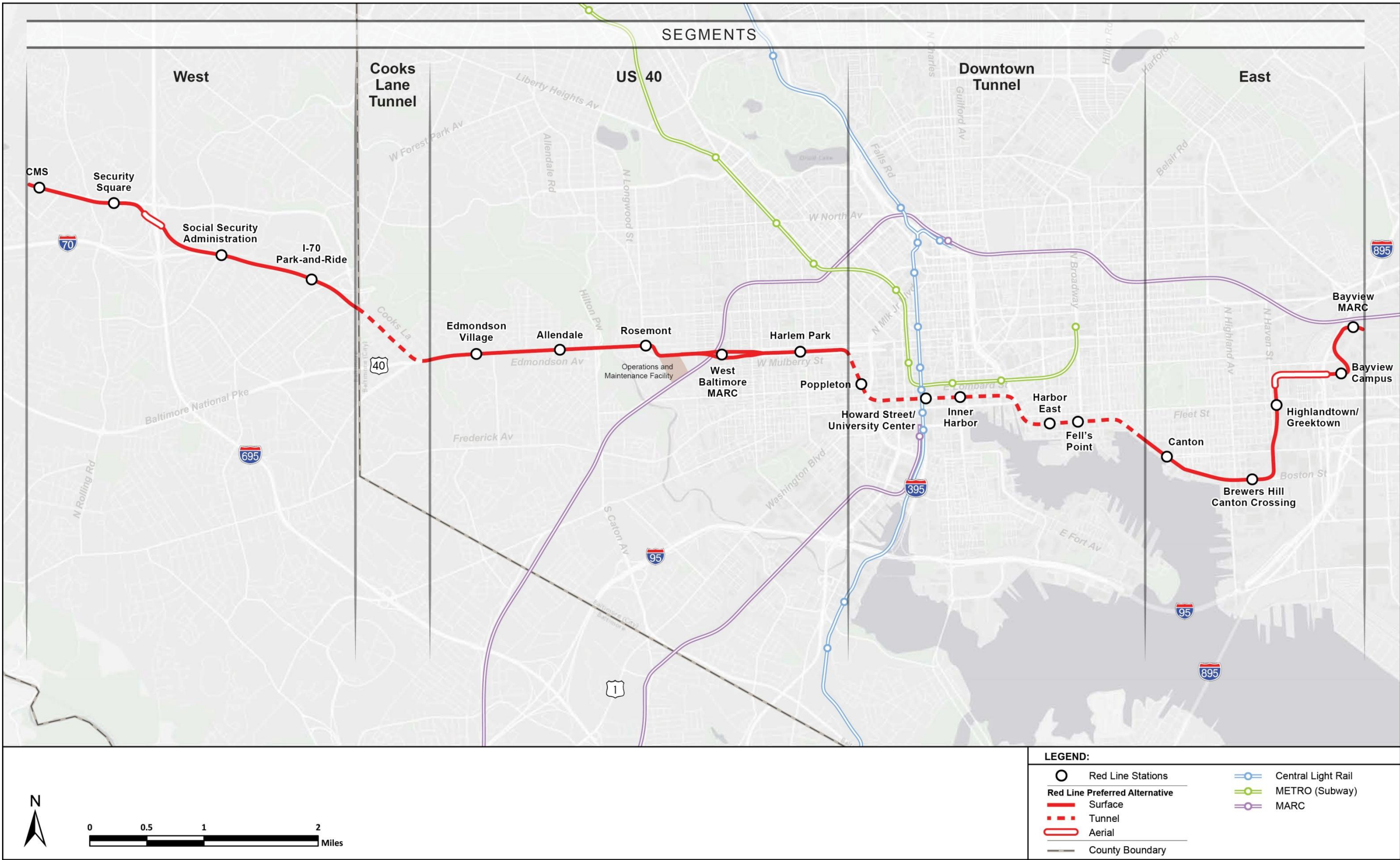


Figure 9: Red line Preferred Alternative

intersection in a twin-bore tunnel beneath Cooks Lane crossing into Baltimore City. The tunnel would continue southeast centered under Cooks Lane to north of Coleherne Road; then curve left towards Edmondson Avenue and continues east following the centerline of Edmondson Avenue. The tunnel would continue along the centerline of Edmondson Avenue ascending through a portal section to meet grade approximately 400 feet west of Swann Avenue (**Figure 10**).

Figure 10: Rendering of the Tunnel Portal on Edmondson Avenue



4.2 US 40 Segment (3.3 miles)

The US 40 segment would begin after the tunnel portal, continuing east in an exclusive right-of-way along the median of Edmondson Avenue crossing Swann Avenue at-grade to the Edmondson Village Station. This center-platform station is located mid-block between Swann Avenue and North Athol Avenue.

The Preferred Alternative would continue east in the median of US 40 with at-grade crossings at traffic signal-controlled intersections at North Athol Avenue, Wildwood Parkway, and North Loudon Avenue to the Allendale Station at the intersection of US 40 and Allendale Street. The Allendale Station would have a split platform with the westbound platform located on the west side of Allendale Street and the eastbound platform located on the east side of the intersection. The Preferred Alternative would continue east at-grade across Denison Street and Hilton Street. The Preferred Alternative would cross over the Hilton Parkway and Gwynns Falls in the center of an existing bridge. Baltimore City is currently developing plans to replace the existing Edmondson Avenue Bridge designed to include accommodations for the Red Line.

The Preferred Alternative would continue east at-grade through the Edmondson Avenue (US 40)/Franklin Street intersection and Poplar Grove Streets. The Rosemont Station platform would be located in the center of Edmondson Avenue east of Poplar Grove Street. East of the Rosemont Station, the Preferred Alternative would turn right and traverse south along the center of Franklinton Road. At the intersection of Franklinton Road and Franklin Street, the

Preferred Alternative would turn left and continue east along the median of US 40/Franklin Street. This is also the proposed location for the Operations and Maintenance Facility (OMF) site on the south side of Franklin Street. Following the existing roadway, the Preferred Alternative would split near Wheeler Avenue and continue east diverging to cross under the Amtrak Northeast Corridor. The Preferred Alternative would maintain the existing structures over West Franklin Street and West Mulberry Street with minor modifications to the bridge structures, roadway, and utilities to protect the structures. The eastbound track would be adjacent to the north side of Mulberry Street, crossing under the existing Amtrak bridge to the West Baltimore MARC Station eastbound platform located at the northwest corner of Smallwood Street and Mulberry Street. The West Baltimore MARC Station westbound platform is located at the southwest corner of Smallwood Street and Franklin Street. The westbound track is adjacent to the south side of Franklin Street. The split tracks would continue east along the edge of the West Baltimore MARC parking lots with separate at-grade crossings of Pulaski Street and Payson Street. The tracks diverge from Franklin and Mulberry Streets and rejoin just west of the North Fulton Avenue Bridge.

The Preferred Alternative would continue east in the median of the existing US 40 lower level roadway corridor. The Preferred Alternative tracks would split east of the Stricker Street pedestrian bridge onto the eastbound left lane of the US 40 corridor. The Harlem Park Station, a center platform station, would be located between Calhoun Street and Carey Street. East of Carey Street the tracks would merge back to double-track before passing under the existing pedestrian bridge at Carrollton Avenue. The Preferred Alternative would continue under the Arlington Avenue Bridge to the portal for the Downtown Tunnel.

4.3 Downtown Tunnel Segment (3.4 miles)

The tunnel would begin in the median of US 40 immediately west of the North Schroeder Street Bridge and would continue east descending into a 1,200-foot tunnel portal within the median of US 40. The tunnel would then curve underneath Mulberry Street and continue south, beneath Fremont Avenue to the proposed underground Poppleton Station located immediately north of Baltimore Street. The entrance to the underground Poppleton Station would be located at the northeast corner of the intersection of Fremont Avenue and Baltimore Street.

The tunnel alignment would continue south and curve east crossing underneath MLK Jr. Boulevard to the center of Lombard Street. The tunnel would continue east beneath Lombard Street to the underground Howard Street/University Center Station, located immediately east of Howard Street. The entrance to the underground station would be located at the northeast corner of Howard and Lombard Streets. The Preferred Alternative would cross under the existing CSX railroad tunnel beneath Howard Street just west of the proposed station.

The tunnel alignment would continue east to the underground Inner Harbor Station located underneath Lombard Street between Light and Calvert Streets. The entrance to the station would be located at the northeast corner of Lombard and Light Streets and along the north side of Lombard Street west of Calvert Street. From this station there would also be a pedestrian

tunnel underneath Light Street to provide a direct connection to the Charles Street Metro Station located underneath Baltimore Street.

The Downtown Tunnel alignment would continue underneath Lombard Street until Market Place where the alignment curves south centered underneath President Street to Fleet Street. The tunnel alignment would then turns east, underneath Fleet Street to the underground Harbor East Station located east of Central Avenue.

The alignment would continue east centered underneath Fleet Street to the underground Fell's Point Station on the west side of Broadway. The entrance to the station would be located in the median of Broadway north of Fleet Street.

The tunnel alignment would continue east underneath Fleet Street to Washington Street and would turn southeast under Chester Street to Boston Street. The tunnel would continue southeast underneath Boston Street to a tunnel portal east of the intersection with Montford Avenue/Hudson Street ascending to the median of Boston Street at surface (**Figure 11**).

Figure 11: Rendering of Tunnel Portal on Boston Street



4.4 East Segment (3.2 miles)

The Preferred Alternative would continue southeast at-grade in the median of Boston Street to the Canton Station. The Canton Station would be a center platform station located west of the signalized intersection at South Lakewood Avenue.

Boston Street would be developed as one lane in each direction from Montford Avenue to Conkling Street. The Preferred Alternative would continue along the center of Boston Street

with at-grade crossings at the signalized intersections of South Lakewood Avenue, South Kenwood Street, Potomac Street (pedestrians only), South East Street, South Clinton Street, and South Conkling Street to the Brewers Hill/Canton Crossing Station. This center platform station would be located between South Conkling and South Eaton Streets and includes a park-and-ride lot with approximately 500-600 parking spaces.

The Preferred Alternative would continue east, at-grade across Eaton Street and would transition diagonally on new right-of-way turning north on the west side of Haven Street. The Preferred Alternative would continue north adjacent to the west side of Haven Street crossing under the O'Donnell Street Bridge into the Canton Railroad right-of-way. The Preferred Alternative would then turn northeast crossing South Haven Street at-grade into the NS right-of-way. The Preferred Alternative would continue north within the NS right-of-way to the Greentown/Highlandtown Station, a side platform station, which would be located south of Old Eastern Avenue. The Preferred Alternative would occupy the western portion of the NS right-of-way, a currently inactive railroad right-of-way, referred to as Bear Creek Branch.

The Preferred Alternative would continue north over Eastern Avenue on the existing freight railroad bridge and then ascend and turn east onto a new aerial structure, passing overhead of the NS right-of-way. The structure would cross above Janney Street, Kresson Street, CSX railroad, NS railroad, Oldham Street, Ponca Street, and I-895 to the Johns Hopkins Bayview Medical Center campus property. The alignment would continue east at-grade along the alignment of Alpha Commons Drive to the Bayview Campus Station. This center platform station would be located immediately west of Bayview Boulevard. The Preferred Alternative would turn north at-grade on the east side of Bayview Boulevard continuing north adjacent to Bayview Boulevard with at-grade crossings of Nathan Shock Drive, a National Institutes of Health (NIH) driveway, and Lombard Street. The Preferred Alternative would continue north turning northeast along the eastside of I-895 to the proposed Bayview MARC Station, the eastern terminus of the Preferred Alternative. A park-and-ride lot with approximately 650 parking spaces is proposed as part of a new Bayview MARC Station, which is separate project to be implemented by the MTA and Baltimore City. At the eastern end of the alignment, 380 feet of tail track would be provided beyond the station for the purpose of operational flexibility.

Appendix A

Baltimore Regional Rail System Plan, August 2002

Appendix B

Notice of Intent, April 11, 2003

Based on the DEIS and the public and agency comments received, a locally preferred alternative will be selected that will be further detailed in the Final EIS.

Issued on: April 8, 2003.

Herman C. Shipman,

Acting Regional Administrator, Federal Transit Administration TRO III.

[FR Doc. 03-8939 Filed 4-10-03; 8:45 am]

BILLING CODE 4910-57-P

DEPARTMENT OF TRANSPORTATION

Federal Transit Administration

Draft Environmental Impact Statement for the Red Line Corridor Transit Project; Baltimore, MD

AGENCIES: Federal Transit Administration (FTA), U.S Department of Transportation.

ACTION: Notice of intent to prepare a Draft Environmental Impact Statement (DEIS).

SUMMARY: The Federal Transit Administration (FTA) and the Maryland Transit Administration (MTA) are issuing this notice to advise agencies and the public that, in accordance with the National Environmental Policy Act, the FTA and the MTA will prepare a Draft Environmental Impact Statement (DEIS) to assess the impacts of potential transit alternatives in the Red Line Corridor. This corridor extends from the Social Security complex in Baltimore County through the Baltimore City Central Business District (CBD) to Patterson Park in Baltimore, MD. The Red Line Corridor Transit Project would connect eastern and western communities of Baltimore City and Baltimore County, providing the first east-west fixed rail or bus rapid transit connection in Baltimore, and would provide convenient and efficient access to major employment centers in downtown and in Woodlawn. Growing traffic congestion in the Baltimore region has been identified, particularly in the western quadrant of Baltimore City and Baltimore County and there is an intent to improve access to jobs and improve air quality. Significant development and revitalization efforts are also underway in the corridor that will require additional transportation access.

A 23-member Advisory Committee to MTA developed the Baltimore Region Rail System Plan and identified a transit project in the Red Line Corridor as a priority project for implementation. The Advisory Committee recommended "that the MTA immediately begin

environmental analysis, planning and design studies" for the project, based on an assessment that this project will best provide an east-west link to jobs, tourism sites and the University of Maryland in the central business district; provide a link to the employment center with 20,000 jobs in the Social Security/Woodlawn area; provide improved transit service to East and West Baltimore communities; and provide connectivity to the existing bus, MARC commuter and Metro rail lines in Baltimore. The project is also included in the Baltimore Region Constrained Long-Range Transportation Plan.

The purpose of the Red Line Corridor Transit Project DEIS is to examine the engineering feasibility, potential benefits, costs, and social, cultural, economic, built and natural environmental impacts of feasible alternatives in the corridor that will improve transit mobility in the Baltimore metropolitan area. The DEIS will examine and evaluate rail, bus rapid transit (BRT), transportation systems management and transportation demand management (TSM/TDM) strategies, and a no-build alternative. Tunnel, surface and/or aerial construction options will be considered for rail and BRT alternatives.

Scoping Meetings: Public scoping meetings for the Red Line Corridor Transit Project DEIS will be held on: June 5—Rosemont Tower, 740 Poplar Grove Street—4 p.m.–8 p.m.

June 7—Woodlawn Community Center, 2120 Gwynn Oak Avenue—10 a.m.–2 p.m.

Additional meeting dates, times and locations will be announced on the project web-site accessed through <http://www.mtamaryland.com>, and these details will be published in the following newspapers:

The Daily Record
The Baltimore Sun
The Catonsville Times
The Baltimore Times
The Afro-American
Howard County Times
East Baltimore Guide
El Tiempo
El Mesejeros
Baltimore Business Journal

Scoping material will be available at the meetings and may also be obtained in advance of the meetings by contacting Mr. Lorenzo Bryant, Project Manager, at the address below. Scoping material will also be made available on the project web-site accessed through <http://www.mtamaryland.com>. Oral and written comments may be given at the scoping meetings or comments may be sent to the address below. A

stenographer will be available at the meetings to record comments. Information will be made available in both English and Spanish.

ADDRESSES: Written comments on the project scope should be sent by August 1, 2003 to Mr. Lorenzo Bryant, Attn: Red Line, Maryland Transit Administration, William Donald Schaefer Tower, 6 St. Paul Street, Baltimore, MD 21202-1614, or via e-mail to railplan@mdot.state.md.us. Mr. Bryant may also be reached by calling (410) 767-3754.

FOR FURTHER INFORMATION CONTACT: If you wish to be placed on the mailing list to receive further information as the study develops, contact Mr. Lorenzo Bryant, Project Manager, or Mr. Jamie Kendrick, Public Outreach Manager, at the above address or railplan@mdot.state.md.us. For further information you may also contact Ms. Gail McFadden-Roberts, AICP, Community Planner, Office of Planning and Program Development, Federal Transit Administration, Region III, phone: (215) 656-7100, fax: (215) 656-7260.

SUPPLEMENTARY INFORMATION:

I. Scoping

The FTA and MTA invite all interested individuals and organizations, and Federal, State, and local agencies to provide comments on the scope of the study. During the scoping process, comments should focus on identifying specific social, cultural, economic, or natural environmental issues to be evaluated and suggest alternatives, which may be less costly or have less environmental impacts, while achieving the similar transportation objectives. The objectives of the Red Line Corridor Transit Project are: to provide the first east-west transit connection in the Baltimore region; to connect communities in eastern and western Baltimore City and County with Baltimore's existing bus, Metro, Light Rail and MARC lines; to provide more efficient travel times for people on one of the most heavily traveled corridors in the region and which is presently subject to increasing traffic congestion; to improve transportation accessibility to existing employment centers in downtown Baltimore and Woodlawn as well as emerging redevelopment areas in Inner Harbor East, Canton, West Baltimore, and at University Center; and to provide a viable transit alternative to single occupancy vehicle (SOV) travel in the Baltimore region, which is a non-attainment area under the Clear Air Act. Comments should focus on the issues

and alternatives for analysis and not on a preference for a particular alternative.

Following the public scoping process, public outreach activities will include: meetings with Local Working Groups established for the study and comprised of community leaders; public meetings and hearings; distribution of a study newsletter; project Web site and electronic mail newsletters; and use of other outreach methods and forums. The purpose of the public outreach activities during the Scoping process is to inform the public of the proposed study process and to solicit input from the community on the proposed study. Every effort will be made to ensure that the widest possible range of public participants have the opportunity to attend general public meetings held by MTA to solicit input on the Red Line Corridor Transit Project DEIS. Attendance will be sought through mailings, notices, advertisements, press releases, and other outreach activities.

II. Description of Primary Study Area and Transportation Needs

The Red Line Corridor Transit Project area extends approximately 10.5 miles in an east-west direction within Baltimore City and Baltimore County. The western-most terminus of the study area is located at the Center of Medical/Medicaid Services approximately 2 miles west of I-695 (Baltimore Beltway) near the Social Security Complex in Baltimore County and extends east through the Baltimore City Central Business District (CBD), ending at its eastern-most terminus near Patterson Park. Much of the study area is intensely developed. The western portion of the study area consists primarily of residential land use while the CBD consists primarily of commercial and office space with scattered high-density residential development. The eastern portion of the study area consists of commercial land use and residential development.

The Red Line Corridor Transit Project would provide a connection for eastern and western communities of Baltimore City and Baltimore County and would provide convenient and efficient access to major employment centers in downtown and in Woodlawn, thus supporting redevelopment and neighborhood revitalization efforts in Baltimore City and Baltimore County. The purpose of the Red Line Corridor Transit Project DEIS is to examine in further detail potential solutions for addressing mobility issues in the Baltimore region. The focus of the DEIS will be to identify a preferred alternative to improve mobility in the region while being sensitive to the socio-economic,

cultural and natural environmental considerations on a local and regional basis.

The following existing and expected future conditions dictate the need for a transit investment in the Baltimore Metropolitan region:

- While growth and development in the region continue at high rates, mobility and access for commuters to transit options within the region has not grown to the same extent; the Red Line transit project would help to improve current travel and access conditions and anticipate future demands;
- Increased travel is causing congestion and the Red Line transit project would give travelers a real choice in how to get from place to place in the region while helping to free road space for those who chose to drive or who must drive;
- Delay affects all transit users, but the time required to complete commutes by bus or rail continue to increase substantially; the Red Line would give the region a needed east-west transit link that would offer new ridership and provide connectivity with existing bus, heavy rail and light rail service, which would enhance the service and ridership of existing facilities;
- The Baltimore Region is struggling to meet federal health standards for air pollution. New development oriented to a new transit system can help the region meet both its air quality and its economic development goals; and
- Many residents in the region lack transit service and any nearby bus service is often inconvenient, limited and slow due to traffic congestion. The Red Line transit project would provide a feasible mode of transport for commuters while improving the efficiency and effectiveness of the current transit services.

III. Alternatives

The alternatives proposed for evaluation include: a no-build alternative, which includes the current network plus all ongoing and committed projects listed in the Transportation Improvement Program (TIP for the years 2002–2006); a TSM/TDM alternative, which would include improving existing transit services such as additional bus service and routes; and build alternatives which include rail and BRT. The no-build alternative will provide a basis for comparison with the TSM/TDM and build alternatives.

Each build alternative will explore the construction of new transportation infrastructure such as tracks, stations, and maintenance yards. Tunnel, surface and/or aerial options will be developed for each of the build alternative

alignments. Multi-modal alternatives will also be explored.

IV. Probable Effects

The FTA and MTA will evaluate all potential changes to the social, cultural, economic, built and natural environment, including land acquisition and displacements; land use, zoning, economic development; parklands; community disruption; aesthetics; historical and archaeological resources; traffic and parking; air quality; noise and vibration; water quality; wetlands; environmentally sensitive areas; endangered species; energy requirements and potential for conservation; hazardous waste; environmental justice; safety and security; and secondary and cumulative impacts. Key areas of environmental concern include areas of potential new construction (*e.g.* structures, new transit stations, new track, etc.). Impacts will be evaluated for both the short-term construction period and for the long-term period of operation associated with each alternative. Measures to avoid, minimize and mitigate any significant adverse impacts will be identified.

V. FTA Procedures

The Red Line Corridor Transit Project DEIS will be prepared in accordance with section 102(2)(C) of the National Environmental Policy Act (NEPA) of 1969 (as amended) and as implemented by the Council on Environmental Quality (CEQ) regulations (40 CFR parts 1500–1508) and Federal Transit Administration (FTA) regulations (23 CFR part 771), and the FTA Statewide Planning/Metropolitan Planning regulations (23 CFR part 450). These studies will also comply with the requirements of the National Historic Preservation Act of 1966, as amended, section 4(f) of the 1966 U.S. Department of Transportation Act, the 1990 Clean Air Act Amendments, the Executive Order 12898 on Environmental Justice, and other applicable rules, regulations, and guidance documents. In addition, if MTA seeks section 5309 New Starts funding for the project, MTA will be subject to the FTA New Starts regulation (49 CFR part 611). New Starts regulation requires the submission of certain specific information to FTA to support a request to initiate preliminary engineering, which is normally done in conjunction with the NEPA process.

Upon completion, the DEIS will be available for both public and agency review and comment. Public hearings will be held within the study area. Based on the DEIS and the public and agency comments received, a locally preferred alternative will be selected

that will be further detailed in the Final EIS.

Issued on: April 8, 2003.

Herman C. Shipman,

Acting Regional Administrator, Federal Transit Administration, TRO III.

[FR Doc. 03-8940 Filed 4-10-03; 8:45 am]

BILLING CODE 4910-57-P

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

[Docket No. NHTSA 2003-14880]

Initial Decision That Certain NexL Sports Products Motorcycle Helmets Fail To Comply With Federal Motor Vehicle Safety Standard 218; Public Proceeding Scheduled To Hear Arguments and To Determine Adequacy of Remedy by NexL Sports Products

AGENCY: National Highway Traffic Safety Administration (NHTSA), DOT.

ACTION: Notice of public meeting.

SUMMARY: NHTSA will hold a public meeting, beginning at 10 a.m. on May 14, 2003 regarding its Initial Decision that NexL Sports Products (NexL) "Beanie DOT Motorcycle Helmets" (model 02) fail to comply with Federal Motor Vehicle Safety Standard (FMVSS) No. 218, *Motorcycle Helmets*. At the same time, NHTSA will conduct a hearing to determine if NexL's remedy for the noncompliance of its model 01 helmets with FMVSS No. 218 was adequate.

FOR FURTHER INFORMATION CONTACT:

Andrew J. DiMarsico, Office of Chief Counsel, National Highway Traffic Safety Administration, 400 Seventh Street, SW., Washington, DC 20590; (202) 366-5263. NHTSA's Initial Decision, and the information on which it is based, is available at NHTSA's Technical Information Services, Room 5111, 400 Seventh Street, SW., Washington, DC 20590; Telephone: 202-366-2588. When visiting Technical Information Services or contacting it via the telephone, refer to Investigation File CI-218-020612.

SUPPLEMENTARY INFORMATION: Pursuant to 49 U.S.C. 30118(a), NHTSA's Associate Administrator for Enforcement made an Initial Decision that NexL model 02 motorcycle helmets do not comply with the requirements of Federal Motor Vehicle Safety Standard (FMVSS) No. 218, *Motorcycle Helmets*, 49 CFR 571.218. These requirements include: Impact attenuation tests,

penetration tests, retention system tests and labeling.

In an impact attenuation test pursuant to S7.1 of 49 CFR 571.218, a guided free fall anvil impacts the helmet at specified locations. The height and speed of the guided free fall anvil are set forth in the Standard. To pass, all of the following requirements must be met: (a) Peak accelerations must not exceed 400g; (b) accelerations in excess of 200g must not exceed a cumulative duration of 2.0 milliseconds; and (c) accelerations in excess of 150g must not exceed a cumulative duration of 4.0 milliseconds.

In a penetration test pursuant to S7.2, a guided free fall test striker impacts the outer surface of the complete helmet. To pass, the metal striker must not come into contact with the surface of the specified test headform inside the helmet.

A retention system test, in accordance with S7.3, addresses the retention system of a helmet on a DOT headform by adding specified force to the retention system. The retention system or its components cannot separate or the test device move more than 1 inch (2.5 cm) when measured between preliminary and test load positions.

For labeling purposes, S5.6.1 requires that each helmet be permanently and legibly labeled with the manufacturer's identification and a label that the helmet meets all applicable FMVSS. The label must also include specific language that is set forth in S5.6.

In 2000, NexL began manufacturing and selling model 01 motorcycle helmets. NHTSA's Office of Vehicle Safety Compliance (OVSC) tested several model 01 helmets on May 18, 2001. Those tests indicated numerous apparent failures to comply with several requirements of FMVSS No. 218. NexL subsequently advised NHTSA in a Noncompliance Information Report, dated March 8, 2002, of its decision that the model 01 helmets did not comply with FMVSS No. 218. NexL therefore conducted a recall campaign (NHTSA No. 02E-008) in which its designated remedy for the noncompliance was to replace each model 01 helmet with a NexL model 02 helmet.

The model 02 motorcycle helmet is a redesigned version of the recalled model 01 helmet. In addition to being NexL's designated remedy for the earlier noncompliance, model 02 helmets have been sold to the public.

As part of its annual compliance testing program, OVSC conducted compliance tests of NexL model 02 helmets at two independent test laboratories. On June 12, 2002, Head Protection Research Laboratory (HPR)

located in Paramount, California tested four NexL model 02 helmets to the performance requirements of FMVSS No. 218. Subsequently, on July 29, 2002, SGS U.S. Testing Company, Inc. (UST), located in Fairfield, New Jersey, tested four other NexL model 02 helmets. Again, on February 28, 2003, HPR conducted more tests on NexL model 02 helmets. Each series of test results indicated failures of NexL's model 02 helmets to comply with many of the requirements set forth in FMVSS No. 218.

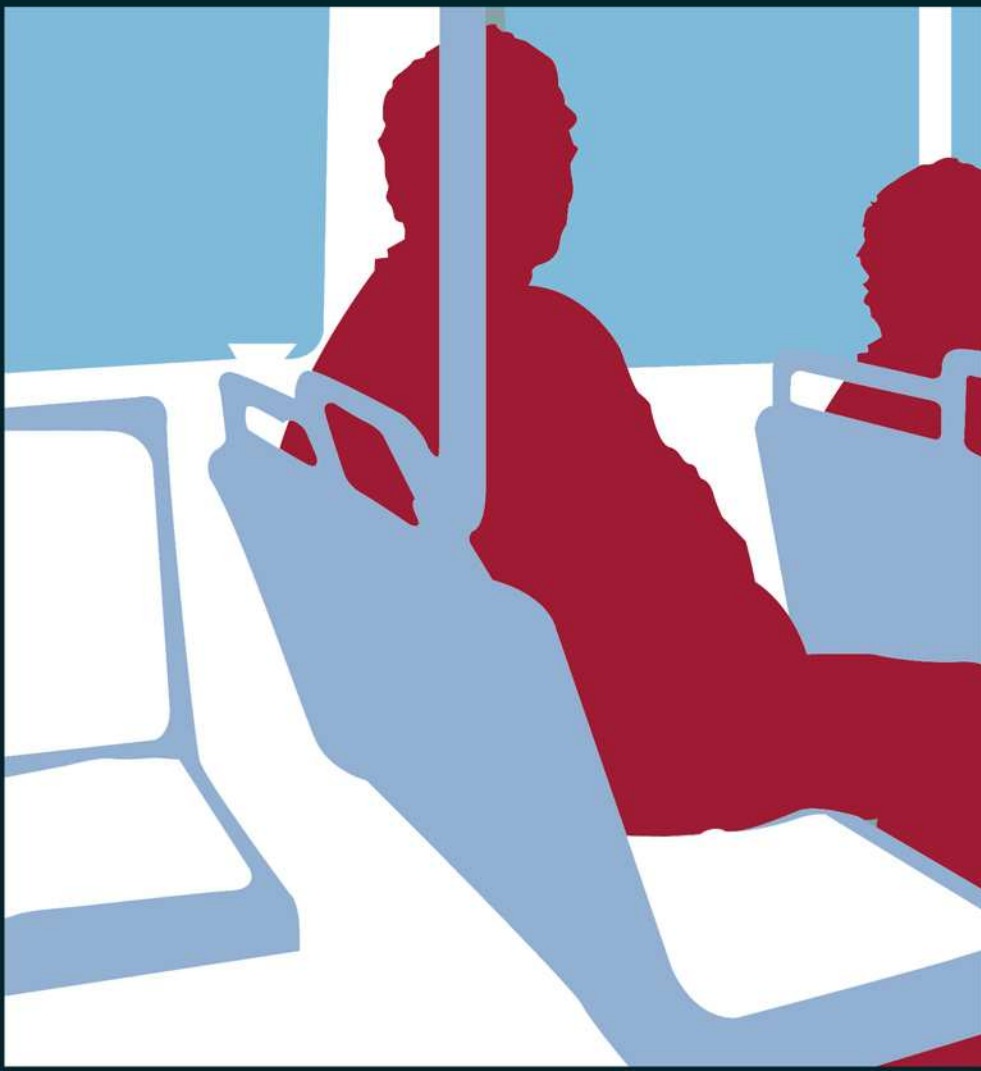
Following initial test failures, OVSC opened an investigation into the compliance of the model 02 helmets with FMVSS No. 218 (CI-218-020612). As part of that investigation, OVSC sent an Information Request (IR) letter to NexL in which it requested information concerning the number of model 02 helmets manufactured by NexL, all tests performed by NexL to support its certification that the model 02 helmets met all applicable FMVSS, consumer complaints, and any engineering analysis regarding the test failures identified by OVSC. NexL responded to that IR on September 4, 2002. Among other things, NexL asserted that the results of tests conducted by Sacramento Test Laboratory (STL), dated August 23, 2002, demonstrated that the model 02 helmets comply with FMVSS No. 218. However, contrary to NexL's assertion, the STL tests also indicate numerous failures to meet the performance requirements of the standard.

OVSC's Report of Investigation, which contains a full description of the compliance investigation, is attached as an Appendix to this notice. The complete public file for the investigation is available at Technical Information Services, Room 5111, 400 Seventh Street, SW., Washington, DC 20590; Telephone: 202-366-2588.

Based upon all of the available information, NHTSA's Associate Administrator for Enforcement has made an Initial Decision, pursuant to 49 U.S.C. 30118(a) and 49 CFR 554.10, that NexL model 02 motorcycle helmets fail to comply with FMVSS No. 218. Pursuant to 49 U.S.C. 30118(b)(1) and 49 CFR 554.10(b), NHTSA will conduct a public meeting, beginning at 10 a.m. on May 14, 2003 in Room 6332, Department of Transportation Building, 400 Seventh Street, SW., Washington, DC, at which time the manufacturer and all other interested persons will be afforded an opportunity to present information, views, and arguments on the issues of whether NexL's model 02 helmets covered by NHTSA's Initial

Appendix C

Scoping Report, October 2004



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL TRANSIT ADMINISTRATION

Scoping Process Report

OCTOBER 2004



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1.0 INTRODUCTION

1.1 PURPOSE OF SCOPING PROCESS AND SCOPING REPORT

The Maryland Transit Administration (MTA) of the Maryland Department of Transportation is developing a Draft Environmental Impact Statement (DEIS) for the Red Line Transit Corridor between the Social Security/Woodlawn area in western Baltimore County, downtown Baltimore, and Fells Point/Patterson Park in southeastern Baltimore City.

In accordance with Section 1501.7 of the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA), the MTA conducted a scoping process to initiate the DEIS. The scoping process was intended to identify initial mode and corridor alternatives, as well as the potential significant human and natural environmental impact issues which will be analyzed in depth as part of the Environmental Impact Statement (EIS). The MTA invited interested persons with potential interest in the corridor to the scoping meetings, as well as federal, state and local agencies with a potential regulatory interest in the corridor. A public outreach and involvement process was carried out during the scoping phase of the study and will be continued as alternatives are refined and mode/alignment decisions are made.

The purpose of this report is to document the steps followed and describe the issues raised during the scoping process for

the Red Line Corridor Transit Study. Previous studies that relate to this study are presented to demonstrate the history of the interest in the corridor. The alternative modes and initial corridors to be evaluated in the DEIS are presented. The scoping process is then documented, as are the comments received from the public, elected officials, and federal, state, and local agencies.

1.2 OVERVIEW OF SCOPING PROCESS AND PUBLIC INVOLVEMENT

The Red Line scoping process was initiated in April 2003 with the publishing of the Notice of Intent (NOI) in the Federal Register. (The MTA simultaneously initiated a Green Line scoping process for a separate project in the Baltimore Region.) The MTA held an agency scoping meeting for both projects on May 16, 2003 at the offices of the Baltimore Metropolitan Council. Five public meetings were held between May 21 and June 18, 2003 to provide opportunities for the public to comment. The initial meeting held in downtown Baltimore was a joint scoping meeting for both Red and Green Line projects, but the other four meetings were specific to the Red Line project. The meeting locations for public scoping meetings were selected to be convenient to interested persons throughout the project study area.

An announcement about the project and the public scoping meetings was mailed to all occupants within ¼-mile of the study corridors and meeting notices were published in newspapers. A mail-back reply card enabled people to sign up for the project mailing list. A public website established for



the project provided information on the public meetings and the study. The MTA also sent a letter to 212 community organizations/institutions located within the project study area to notify them about the project and the public meetings.

Attendees at each meeting were asked to complete a comment card; 140 comment cards were submitted. Total attendance at the five public scoping meetings was 196.

Public comments that were received pertained to a range of issues including the modes of transit to be studied, impacts of the project on parking and traffic, alternative alignments and station locations to be considered, and linkages to MTA's existing transit modes.

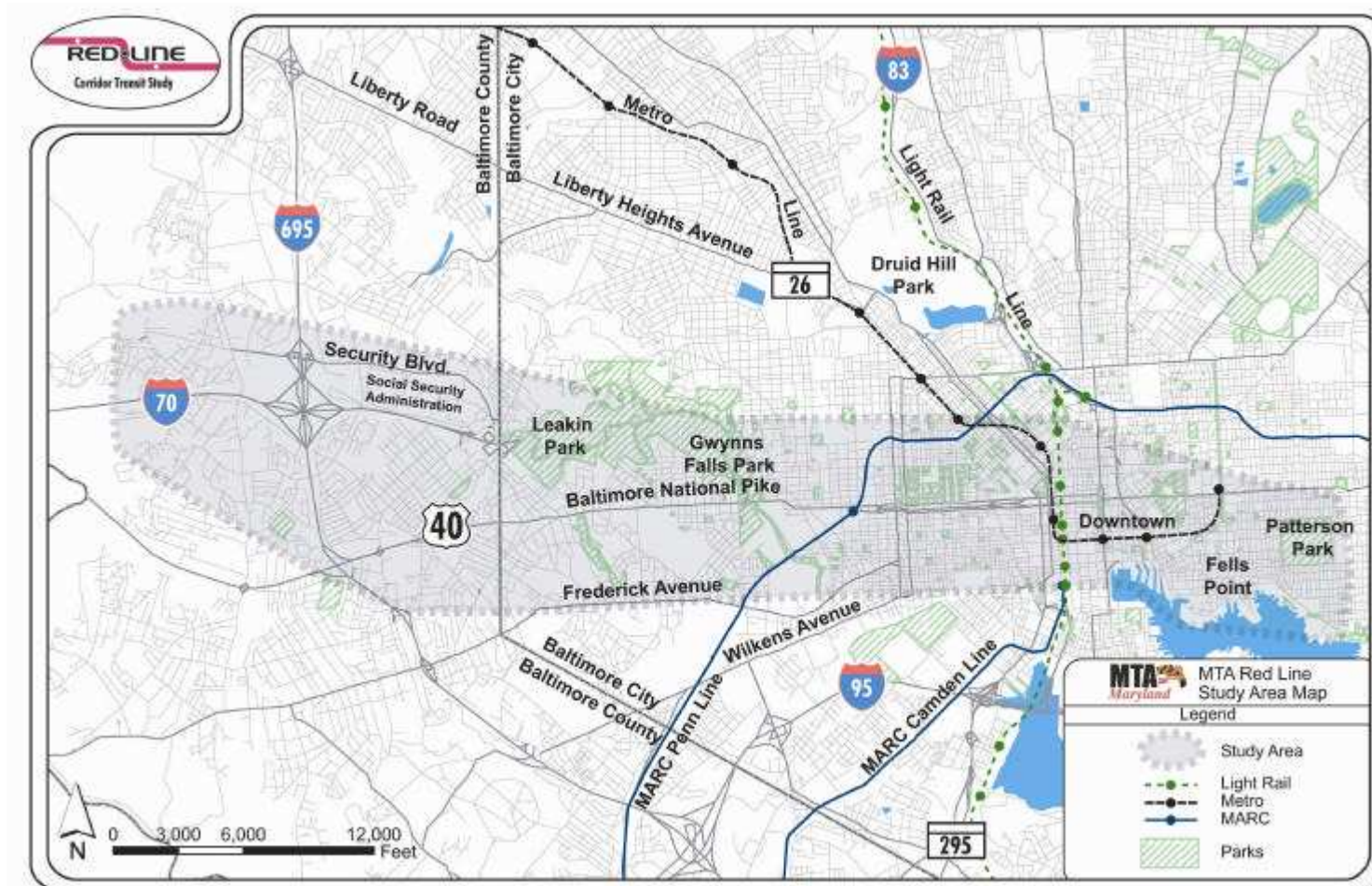
A project mailing list was established from the mail back replies, the e-mail replies on the public website, and the public comment cards. It is intended that the mailing list be used to notify interested persons of the status of the project and subsequent public meetings.

1.3 PROJECT DESCRIPTION

The portion of the Red Line corridor to be studied extends in an east-west direction within Baltimore City and Baltimore County for approximately 10.5 miles. The western most terminus of the study area is located in the Woodlawn area of Baltimore County at the Center for Medicaid and Medicare Services (CMS), formerly the Health Care Financing Administration, approximately one mile west of I-695 and near the intersection of Security Boulevard and Rolling Road. The

headquarters of the Social Security Administration (SSA) is approximately 2 miles east of CMS. The corridor extends eastward following the U.S. 40 corridor through west Baltimore, downtown Baltimore, Fells Point, and to Patterson Park at its eastern-most terminus.

FIGURE 1: MTA RED LINE STUDY AREA MAP





Much of the study area is intensely developed as residential, particularly between Edmondson Village to the west and Patterson Park to the east. The study area crosses through Gwynns Falls/Leakin Park, a large City-owned park, located approximately midway in the study corridor between Downtown and Woodlawn. Major concentrations of employment and commercial uses are located in Woodlawn and Downtown.

PURPOSE OF PROJECT

The purpose of the Red Line Corridor Transit Project is to:

Improve system wide public transit efficiency. There is a need to improve the efficiency of the existing transit system in Baltimore. Transit improvements in the Red Line corridor would represent the first phase of an overall plan for improving transit in the Baltimore region in a cost-effective and efficient manner.

Improve transportation choices. The Red Line corridor currently faces congestion and limited transit options. Transit improvements would help accommodate existing and future demand, including addressing travel needs in low income and transit dependent areas.

Improve transit system connectivity. Baltimore currently has an extensive bus system and Metro, light rail and MARC service. There is a need for better connections between transit services, and the Red Line Study will investigate transit improvements in the Red Line corridor which would improve system connectivity.

Improve mobility. There is a need to improve mobility in the Red Line corridor, both for residents living within the corridor and to major employment centers and institutions within the corridor.

Support community revitalization and economic development. There are needs for community revitalization and economic development within the Red Line corridor. Transit improvements will be analyzed as one tool which may increase opportunities for revitalization and development.

Assist in meeting air quality goals. The Baltimore region has been designated a moderate non-attainment area for ozone by the Environmental Protection Agency. Increased use of transit could lower vehicle-related emissions in the corridor and region, thereby helping the region to stay in consistency with state air quality plans.

2.0 PRE-SCOPING PROCESS ACTIVITIES

The study area has been the subject of several previous studies by state, regional, and local agencies. These studies are summarized below.

2.1 PREVIOUS LOCAL ACTIONS

Both Baltimore City and Baltimore County have supported the concept of rapid transit for an east west corridor in the region.

BALTIMORE COUNTY MASTER PLAN.

Both the 1989 and 2000 versions of the Baltimore County Master Plan include support for rapid transit access to western Baltimore County in the area of Social Security/Woodlawn.

BALTIMORE CITY MASTER PLAN

Baltimore City has not adopted an official comprehensive plan since 1976. Included in the transportation element of that comprehensive plan was an east-west rapid transit line, although a mode and alignment were not specified. The City's 1999 long-range master plan (Draft) referred to as Plan Baltimore included an east-west rapid transit line.

BALTIMORE CITY – PEOPLE MOVER ISSUES REPORT STUDY

In 1998, Baltimore City conducted a People Mover Issues Report Study to identify and document issues associated with the planning, design, and construction of a people-mover system between a major new mixed-use and hotel development

FIGURE 2: MAP OF REGION





between the Inner Harbor East and the Baltimore Convention Center and Camden Yards. No specific alignment was recommended in the study.

BALTIMORE CITY – EAST-WEST TRANSIT CONNECTOR STUDY

As a follow-up to the People Mover Issues Report, the City conducted a broader East-West Transit Connector Study to examine additional mass transit modes and alternative vehicles in a study area extending approximately from Martin Luther King Boulevard on the west, to Canton on the east, the Inner Harbor, and the Franklin-Mulberry corridor. A people-mover system, light rail transit, historic trolley, and premium bus were considered and ridership estimates ranged from 4,500 to 6,550 riders daily. Capital costs ranged from \$33.3 million for premium bus service to \$151.8 million for light rail transit. The study documented, at a cursory level, those items which would typically be studied in-depth through an Environmental Impact Statement (EIS).

The final recommendation of the East-West Transit Connector Study was for a historic trolley along Pratt Street connecting to Aliceanna Street in Inner Harbor East/Fells Point by traversing Pier 5 and several inlets on the Inner Harbor. The proposed line would have then proceeded east on Aliceanna Street to Boston Street where it would continue until terminating at the east end of Canton.

BALTIMORE CITY – WESTSIDE INTERMODAL CORRIDOR STUDY

In July 2001, Baltimore City Department of Public Works published the Westside Intermodal Corridor Study (WICS). The study scope of work was to identify and evaluate potential roadway, transit and park improvements within the study area (the Franklintown Road corridor, Gwynns Falls/Leakin Park, and east of the Gwynns Falls to Downtown), and to develop a final set of preferred alternatives that reflected public input and study area needs.

As it relates directly to the Red Line Corridor Transit Study, WICS evaluated numerous transit alternatives including:

Bus-based Alternatives

- Restructuring of bus routes 2, 15, and 20 by making the lines more direct and replacing branches and diversions with neighborhood circulator service.
- Expanding express bus service to the SSA and CMS.
- Establishing transit centers to facilitate quality passenger transfers.

Light Rail Alignment Alternatives

- From Martin Luther King Boulevard along U.S. 40, or along the Franklin-Mulberry one-way pair, or along the Baltimore-Fayette one-way pair, or along Saratoga Street; then,
- Via the Monroe-Fulton one-way pair to North Avenue and through Leakin Park to I-70 at the City line, or



- Along the CSX Western Maryland right-of-way to Franklinton Road and through Leakin Park to I-70 at the City line, or
- Along Edmondson Avenue to Cooks Lane or along Edmondson Avenue following Baltimore National Pike to Rolling Road; then
- Via Security Boulevard or I-70 to Security Square Mall and the Social Security Administration.

The study also considered Bus Rapid Transit alternatives but did not specify whether the corridors would be the same or different from those proposed for light rail. Bus-based improvements were recommended to the MTA.

2.2 PREVIOUS REGIONAL ACTIONS

The Baltimore Regional Planning Council's (RPC) 1967 "Suggested General Development Plan" included six radial rapid rail transit lines linking to a central downtown loop. The rail lines extended from the downtown loop north to Hunt Valley, northeast to White Marsh, northwest to Owings Mills, west to UMBC, south to the Airport and Glen Burnie, and east to Dundalk. Possible extensions of these lines were also shown.

A western rail rapid transit line, terminating in Woodlawn or at the Social Security Administration headquarters, has consistently been supported since 1967 in the subsequent regional plan updates of 1972, 1977, 1982, and 1986. In 1992, the Baltimore Metropolitan Council succeeded the Baltimore Regional Council of Governments (which had previously

changed its name from the Regional Planning Council) with a focus mainly on transportation issues. As part of this restructuring, the General Development Plan was renamed the Baltimore Regional Transportation Plan. The Baltimore Regional Transportation Plans of 1993, 1998, and 2001 all included a western rail alignment.

All of the adopted regional plans have envisioned either light rail transit (LRT) or heavy rail transit (HRT) for the corridor between Downtown and the Social Security Administration in Woodlawn. Sketch level corridor planning only was completed for these plans so that order of magnitude ridership and cost estimates could be developed. The corridors included in those plans are generally consistent with the corridor alternatives proposed for study during the scoping phase of the Red Line Corridor Transit Study.

2.3 PREVIOUS STATE ACTIONS

BALTIMORE METROPOLITAN AREA TRANSPORTATION STUDY/BALTIMORE REGION RAPID RAIL PLAN

In 1964, a Baltimore Metropolitan Area Transportation Study (BMATS) was completed for the Maryland State Roads Commission (now State Highway Administration (SHA)). The BMATS study mainly focused on highway needs for the region but included a general discussion on the "Potential for Rapid Transit". The study assumed that rail would operate in the median of six radial highway corridors outside of downtown and within a separate right-of-way in the central business district. Those corridors were: the Northwest Freeway from the Beltway to I-70; I-70 west from the Beltway to Fremont



Avenue; I-95 southwest from the Beltway to the Arundel Freeway; along the Arundel Freeway from the Beltway to I-95; along I-95 east from the Harbor Tunnel throughway to I-83; and along an extension of Perring Parkway from the Beltway to Greenmount Avenue in the city.

The earliest long-range transit plans were completed by MTA's predecessor the Metropolitan Transit Authority, in 1965. This plan proposed six radial rail lines in the region centered around a city loop. Lines to the northwest and south were considered as the Phase I Rapid Transit Plan. Lines to the north, east, west, and northeast were shown as future service corridors. The planned northwest line was to serve from Owings Mills to Charles Center, and then continue south to a terminus at Marley.

In 1971, the MTA adopted the northwest and south corridors as its Phase I plan. These Phase I corridors were included in the RPC's 1972 Plan.

In 1983, the MTA completed a study that compared bus and rail transit alternatives for the west, northeast, and east/southeast corridors. The Alternatives Analysis/Environmental Impact Statement process was completed for the northeast corridor in 1987. The Baltimore Metro Line was constructed in three phases from 1983-1995. The extension of the Metro from Charles Center to Johns Hopkins Hospital was the most recent section opened in 1995.

In 1987, The MTA examined the feasibility of light rail for the north, south, west, and outer northeast corridors. The decision to build the Central Corridor Light Rail Line from Hunt Valley to Glen Burnie was based on that evaluation.

COMMUTER ASSISTANCE STUDIES

In the 1990 Commuter Assistance Studies (CAS), the Maryland Department of Transportation completed detailed analysis of 24 travel corridors throughout the state. The purpose of the CAS was to identify, evaluate, and recommend those actions which could be taken to improve the daily commuter's trip to work. In addition, the studies were intended to establish an ongoing statewide transportation planning process.

Each corridor report identified and evaluated growing congestion that threatened to choke off economic and social vitality, identified specific corridors experiencing severe congestion during rush hours, and identified locations with localized congestion of shorter duration. Each report presented a range of transportation improvements to address the problems. The reports also identified existing linear rights-of-way. Two of the evaluated CAS corridors fall within the current study area of the Red Line Corridor Transit Study:

- Corridor 3 covered the area between the Shot Tower Metro Station and Essex. The study assumed an underground alignment but recommended that the potential for at-grade alignments be examined. Integration with the Central Light Rail corridor was deemed important to attracting riders.
- Corridor 5 covered the area from Frederick to Woodlawn to downtown Baltimore. Light rail alternatives to Woodlawn were suggested for further study.



STATEWIDE RAIL FEASIBILITY STUDY

In 1997, the MTA completed a statewide feasibility study of potential rail transit lines. Two alignment options in the Downtown to Woodlawn corridor were studied. The first alignment proceeded along Edmondson Avenue, tunneling under Gwynns Falls/Leakin Park, and terminated near Security Square Mall. A second alignment proceeded west on North Avenue from the Central Light Rail Line (CLRL) station, tunneling under Gwynns Falls/Leakin Park, and terminated near Security Square Mall. Both alignments used Security Boulevard between Gwynns Falls/Leakin Park and Security Square Mall.

MARYLAND TRANSIT ADVISORY PANEL/MARYLAND COMPREHENSIVE TRANSIT PLAN

In 1998, Maryland Transportation Secretary John Porcari appointed a 28-member Transit Advisory Panel (TAP) to develop a policy framework for improving and expanding transit in the state of Maryland. The January 1999 TAP Report called for expanding rail service in the region with a downtown light rail loop, a northeast line to White Marsh, and a western line to Social Security/Woodlawn.

An implementation plan was developed from the TAP recommendations. It was referred to as the Maryland Comprehensive Transit Plan (MCTP). While no detailed alignment was suggested for the western line, the MCTP recommended that planning studies be conducted in 2002–2004 with construction to occur before 2020. A \$1.2 billion capital cost was assumed.

DOWNTOWN LOOP FEASIBILITY STUDY

The MTA completed a Light Rail Transit Downtown Loop Feasibility Study in October 2001. This technical study assessed the engineering and environmental feasibility of providing circumferential light rail service between Penn Station and Pratt Street. The report presented spur, shuttle, and loop alignment alternatives to connect Penn Station with the east side of Downtown. The corridor's suitability to serve as a portion of a hub for regional transit service was also considered. The study concluded that:

- At-grade options using existing light rail vehicles are not desirable since the CLRL vehicle length exceeds city block lengths in the corridor. This means that train operations would interfere with cross street traffic.
- High block platforms needed for ADA accessibility could not be accommodated on narrow sidewalks.
- There is a lack of suitable locations for stations in the study area.
- The turning radius required for the CLRL would impact buildings.
- Feasible at-grade options for this system would include a shuttle or circulator with smaller vehicles.

The Downtown Loop Study identified fundamental operational and design issues relevant to Baltimore City and the MTA that



need to be addressed before a formal project planning study should proceed.

BALTIMORE REGION RAIL SYSTEM PLAN

The MTA began work on the Baltimore Region Rail System Plan in the summer of 2001. In 2002, the completed plan recommended 63 additional miles of new rail service, including the Red Line (an east-west line from the Social Security Administration to Dundalk via downtown Baltimore and I-70). Although no specific mode was defined for the Red Line corridor, significant emphasis was placed on the concepts of speedy and reliable service that could compete directly with auto travel. The plan also emphasized maximizing the use of existing infrastructure (such as existing MARC rights-of-way) and easy connections from one line to another (via built-in transfer points at Charles Center and Lexington Market). The section of the Red Line between Fells Point and Social Security was recommended as a priority project of the Rail Plan.

By way of letter to Governor Robert L. Ehrlich, Jr. on February 4, 2003, the chief executives of the Baltimore-area counties and the City of Baltimore, acting as the Baltimore Metropolitan Council (BMC), endorsed the Baltimore Region Rail System Plan and requested that the State seek Federal funds for priority segments of the plan (including the Red Line between Fells Point/Patterson Park and Social Security/Woodlawn).

By way of letter to Governor Robert L. Ehrlich, Jr. on January 15, 2003, the Greater Baltimore Committee (GBC) expressed its support for the plan, citing the plan's importance to the future success and economic growth of the greater Baltimore region. Copies of these letters are shown in Appendix #1.

In an effort to better envision the recommendations from the Baltimore Region Rail System Plan, the MTA initiated feasibility investigations of the two priority projects identified by the Advisory Committee: the Red Line between Fells Point and Social Security, and the Green Line extension from Johns Hopkins Hospital to Morgan State University. The purpose of the Red Line Feasibility Study was to develop and make an early evaluation of wide-ranging possible alignments, station locations, maintenance yard locations, and identify associated operational and performance issues for initial input into the project development process of the Red Line corridor. The study also obtained and generated cursory background data for use in evaluating the conceptual alternatives. Limited agency coordination was conducted to identify significant local government and institutional issues that should be considered in the context of the conceptual alternatives.



3.0 PUBLIC AND AGENCY SCOPING

3.1 SCOPING ACTIVITIES PRIOR TO THE PUBLIC SCOPING MEETING

Prior to initiating the formal scoping process, MTA endeavored to learn more about the communities in the Red Line corridor, the issues facing these communities, and thoughts and impressions on the potential Red Line transit project. Between November 2002 and May 2003, MTA staff met individually with 52 representatives of community organizations, business associations, and other institutions in the corridor. These meetings served the purpose of explaining the purpose and process of the Red Line Corridor Transit Study. A summary of the Pre Scoping "Listening Tour" meetings can be found in Appendix #2.

In addition to contact with community leaders, MTA also began to coordinate with local government officials from several agencies. In the fall 2002, MTA hosted a corridor site tour of the Red Line corridor for senior staff representatives of the Mayor's Office of Neighborhoods, and the Baltimore City Departments of Planning, Transportation, and Housing/Community Development and the Baltimore County Departments of Planning, Community Conservation, Environmental Protection and Resource Management, and Public Works. Periodic status meetings with the City Transportation Department and the County Public Works Department, designated as the lead local agencies on the Red Line Project, were also held from March 2002 to August 2002.

The purpose of these meetings was to define study goals and develop alternatives that would be shared during the scoping process.

Finally, in preparation for the public scoping meetings, MTA convened a working group of community organization and local government representatives to help plan outreach activities to make the public aware of the scoping meetings. The working group was comprised of representatives from the following organizations:

- Mayor's Office of Neighborhoods
- Baltimore County Executive's Office
- Baltimore City Planning Department
- Baltimore County Office of Community Conservation
- Citizens Planning and Housing Association
- Transit Riders League
- Baltimore Regional Partnership
- Downtown Partnership of Baltimore
- Baltimore Metropolitan Council

Members of this group also assisted by informing their organization members of the scoping meetings and sharing information with other community organizations.

3.2 NEPA NOTICE OF INTENT (NOI)

On Friday, April 11, 2003, the Federal Transit Administration (FTA), on behalf of the MTA, published a NOI to prepare a DEIS for the Red Line Corridor Transit Study (Federal Register Vol. 68, No. 70). Through this notice agencies and the public were notified that, in accordance with NEPA, the



FTA and MTA will prepare a DEIS to assess the impacts of transit alternatives in the corridor between the Social Security complex and Woodlawn in western Baltimore County through the Baltimore City Central Business District and to Fells Point in southeastern Baltimore City. The DEIS will examine the engineering and operational feasibility, costs and potential social, cultural, and economic and natural environmental benefits and impacts resulting from transit alternatives in the corridor that will improve transit mobility for the Baltimore metropolitan area. The NOI also advised agencies and the public of several public scoping meetings to be held in May and June 2003, and that written comments on the project scope would be accepted until July 31, 2003. Refer to Appendix #3 for a copy of the published NOI.

3.3 INTERAGENCY SCOPING MEETING

On May 16, 2003, MTA held an agency scoping meeting for representatives of regulatory and other public agencies involved in the preparation of the EIS. On April 22, 2003, the MTA issued written letters of invitation to the following agencies:

- Federal Transit Administration
- Federal Highway Administration
- Environmental Protection Agency
- National Park Service
- National Marine Fisheries Services
- U.S. Fish and Wildlife Services
- U.S. Army Corps of Engineers (USACE)

- Baltimore City Commission on Historic and Architectural Preservation (CHAP)
- Maryland State Highway Administration
- Maryland Department of Planning (MDP)
- Maryland Historic Trust (MHT)
- Maryland Department of Natural Resources
- Maryland Department of the Environment (MDE)
- Baltimore Metropolitan Council (BMC)

At the meeting, MTA staff presented background information regarding the Baltimore Region Transit Plan and identified the Green and Red Lines as recommended priority projects. MTA then reviewed the purpose of the Red Line study, identified the study area and the range of alternatives proposed for study, and reviewed basic information on known environmental and cultural resources in the study area. Agency representatives asked questions about the selection of priority projects, the expected cost of the Red Line, public involvement activities during the study, and the process for station area planning. Questions were also asked about coordination with the Gwynns Falls Trail and the history of the I-70 extension into Baltimore City. Meeting minutes and the handout from the meeting are provided in Appendix #4.

At the close of the meeting, MTA asked agency representatives to provide written comments on the scope of the Red Line study by July 31, 2003. A summary of written comments received from agencies may be found in Section 4 of this report.



3.4 NOTICE OF THE PUBLIC SCOPING MEETING

LETTERS TO COMMUNITY ORGANIZATIONS AND INSTITUTIONS

By letter dated April 27, 2003, MTA notified 212 community organizations or institutions in the study corridor of the Red Line scoping process. Organizations and institutions that received letters were identified from the *Baltimore City Community Association Directory* and from lists maintained by the Baltimore County Offices of Planning, Public Works, and Community Conservation. MTA staff followed-up this letter with a telephone call one week in advance of the meeting nearest the community association. A sample copy of a letter sent to community association leaders is included in Appendix #5.

LETTERS TO ELECTED OFFICIALS

MTA notified 65 local, state, and federal elected officials of the Red Line scoping process by way of letter dated April 22, 2003. Four elected officials requested and received individual briefings on the study. The list of state and local elected officials that were notified is included in Appendix #6.

CORRIDOR MAILINGS

MTA used direct-mail marketing to reach 84,280 households and businesses in the Red Line corridor. The mailing included a description of the study process and scoping meeting information, as well as a postage-paid postcard that could be returned to join the project mailing list. In the months since the mailing, approximately 1,525 people returned postcards

requesting to be kept informed on the project by way of the project mailing list. (Appendix# 7)

PROJECT WEBSITE

A project website (www.baltimoreregiontransitplan.com) was established in mid-April 2003, providing the ability to download materials presented at scoping meetings and to submit comments for the record.

E-MAIL DISTRIBUTION LIST

Using an e-mail list created during the development of the Baltimore Region Rail System Plan, MTA notified approximately 1,450 individuals of the Red Line Corridor Study meetings and issued periodic reminders about upcoming scoping meetings. Information about the scoping meetings was also included in the *Mayor's Neighborhood News Flash*, a weekly e-mail distribution to City residents.

NEWSPAPERS

Newspaper ads were placed to coincide with meetings in specific geographic areas, where possible. Other ads were placed in newspapers of general circulation. In some cases, newspaper ads were placed jointly for the Red Line and Green Line project. A list of the newspaper notices placed is presented in Table 1. Refer to Appendix #8 for a sample of the newspaper notice in the Baltimore Sun.



Table 1

Newspaper Ads

Publication	Publication Date
The Baltimore Sun	May 18, 2003 June 1, 2003
The Daily Record	May 12, 2003
The Afro-American	May 16, 2003 June 6, 2003
Baltimore Times	May 16, 2003 May 30, 2003
Catonsville Times	May 28, 2003
Howard County Times	May 15, 2003
El Tiempo	May 16, 2003
City Paper	May 14, 2003 June 4, 2003

TELEVISION ANNOUNCEMENTS

Notice of scoping meetings was broadcast over the media in several formats, including announcements during MTA *Transit Team* traffic rush-hour reports, on the MTA television shows broadcast on local cable channels, and in news reports of local affiliates.

OUTREACH TO TRANSIT USERS

Special emphasis was placed on informing current bus riders about the Red Line corridor study. Fliers were distributed to bus riders on various routes in the Red Line corridor. Advertisements were placed on the interior of MTA buses and light rail vehicles. MTA also worked with the Transit Riders

League of Metropolitan Baltimore, a citizens' advocacy group that works with the public to improve transit in the region, to be sure that scoping information was included in the organization's newsletter.

PRESS RELEASES

Several print and broadcast media outlets responded to an MTA press release about the Red Line scoping meetings. Articles or briefs were published in the *Baltimore Sun*, the *Catonsville Times*, the *East Baltimore Guide* and the *Dundalk Eagle*. Reporters from local radio and TV stations are known to have attended scoping meetings or broadcast information about the meetings.

POSTER CAMPAIGN

Posters about Red Line scoping meetings were placed in grocery stores, churches, and community centers throughout the corridor. All public libraries in the study corridor received scoping information for public display.

3.5 PUBLIC SCOPING MEETINGS

LOCATIONS AND PARTICIPATION

MTA held five public scoping meetings in the Red Line Corridor study area, including a joint scoping meeting in downtown Baltimore with the Green Line Corridor Transit Study (See Table 2). All meetings were held in locations accessible by MTA services and accessible to persons with disabilities.

Table 2

Location of Scoping Meetings

Date and Time	Location	Number of Attendees
Tuesday, May 21, 2003 11:00 AM to 8:00 PM	War Memorial Building 101 N. Gay Street Downtown Baltimore	24
Thursday, May 29, 2003 4:00 PM to 8:00 PM	Hampstead Hill Elementary School 500 S. Linwood Avenue Southeast Baltimore	21
Thursday, June 5, 2003 4:00 PM to 8:00 PM	Rosemont Tower Senior Apartments 740 Poplar Grove Street West Baltimore	54
Saturday, June 7, 2003 10:00 AM to 2:00 PM	Woodlawn Community Center 2120 Gwynn Oak Avenue Western Baltimore County	13
Wednesday, June 18, 2003 4:00 PM to 8:00 PM	St. William of York Parish Hall 600 Cooks Lane Southwest Baltimore	84

Following the last Red Line scoping meeting on June 18, 2003, MTA staff reviewed sign-in sheets from all meetings to determine whether or not each community association identified in the study corridor was represented at the meeting. For those community associations not represented, MTA sent a follow-up letter with a copy of the scoping package and a

comment form. Several community organizations responded to this mailing with comments and requests for additional information. Presentations were also made to the Harlem Park Community Association, Friends of Gwynns Falls/Leakin Park, Fells Point Community Association, and the Barre Circle Community Association after the scoping meetings were held. Finally, an e-mail was sent to the project e-mail list noting the close of the scoping comment period and requesting additional public comment.

MEETING FORMAT

Meetings were held in an “open house” format with MTA technical and public involvement staff available to explain and answer questions about the study process, the purpose of the study, and the alternatives proposed for consideration. For the four-hour period, interested persons were free to browse the displays and talk to project staff. A four-page brochure explaining the study was also given to all attendees, along with a map of the study corridor and alignments being proposed for study. Comment cards were available to participants at each meeting site and a table and chairs were provided where people could sit down to complete their comments cards, if desired. Copies of the presentation boards shown at the public scoping meetings and the handout provided to attendees are included in Appendix #9.

ALTERNATIVES PRESENTED

In the scoping process, MTA presented numerous modal alternatives that could potentially meet the goals of the Red Line Corridor Transit Study. The mode alternatives that are under consideration for the Red Line include:



- Light Rail Transit (LRT) is an electric railway system characterized by its ability to operate single cars or short trains along rights-of-way at ground level, on aerial structures and in tunnels. Light rail can also operate in the street mixed with vehicular traffic or in the median of a roadway.
- Bus Rapid Transit (BRT) consists of buses operating in exclusive rights-of-way or on roads with improvements to allow buses to bypass traffic congestion. BRT has the ability to use express buses combined with feeder buses. With a BRT system, feeder buses could loop through a neighborhood or business area, picking up passengers close to their point of origin. It then could enter the busway via a special ramp and serve stations just like a rail vehicle would. It could leave the busway near its destination and circulate through local streets. BRT stations are similar to a rail transit system.
- Enhanced bus service or Transportation System Management (TSM) consists of improved bus service throughout the corridor and possible construction of park and ride lots. Some of the improvements could be to existing bus service within the corridor via increasing service frequency and/or adding service to locations not presently served.
- No-build alternatives are the foundation for comparing all of the other alternatives. They consist of all existing and programmed transit and roadway improvements.

In terms of possible corridor alignments, depending on the location and type of transit mode, the line, or a segment of the

line, could be constructed either in underground tunnel, at ground level, or elevated like a bridge.

A study area map was also presented with potential station locations shown. Refer to Map in Appendix 10c. Starting from the west and moving east, two possible termini are proposed. A terminus on I-70 between the Patapsco River and I-695 could serve as the beginning of the transit line that would follow the I-70 corridor, curving south to the Beltway before turning in an easterly direction to the Route 40/Edmondson Avenue corridor. An alternative western terminus is proposed for study near CMS on Security Boulevard, west of Rolling Road. From there, a proposed alignment option is shown to proceed easterly along the Security Boulevard corridor to SSA headquarters, where it would turn south along the Woodlawn Drive corridor to I-70. From I-70, this alignment option would also proceed to the Route 40/Edmondson Avenue corridor taking any of three alternative directions: east along I70 to southeasterly along Cooks Lane; south along Woodlawn Drive to Ingleside Road to Johnnycake Road; or travel west before heading south to the Beltway as described above.

All proposed lines being considered for study are shown to converge in the Cooks Lane area where any one line would proceed along the Route 40/Edmondson Avenue corridor to the Edmondson Avenue/Franklin Street junction in Baltimore City. Taking either the Edmondson Avenue or Franklin Street/Mulberry Street corridor, the line would connect to the West Baltimore MARC station where it would then continue east along Route 40 as it enters the downtown area.



Several downtown corridor alternatives are proposed for study, which are shown to start at the Franklin Street/Mulberry Street underpass and Fremont Street junction. Two of these possible alignments would intersect with the Green Line (Metro Subway) at Lexington Market and Charles Center:

- One possible alignment option could continue east, taking the Franklin Street/Mulberry Bridge over Martin Luther King Boulevard, curve south along the Paca Street corridor, and then turn east along the Pratt Street corridor through the University Center, Camden Yards, and Inner Harbor areas to President Street.
- Another possible alignment option could proceed further east, swinging to the southeast after leaving the underpass, and follow the Saratoga Street corridor before turning south to the St. Paul Street corridor. It could then move east along the Pratt Street corridor to President Street.
- A third alternative being considered for study is an alignment that proceeds southeasterly down the Fremont Avenue corridor to the east side of Martin Luther King Boulevard where it could curve easterly to the Pratt Street corridor before reaching President Street.
- Corridor options from President Street to the Patterson Park terminus include either Eastern Avenue or Fleet Street.

MATERIALS DISTRIBUTED AT THE MEETINGS

A copy of the scoping meeting handout is included in Appendix #9.

3.6 Ongoing Public and Agency Involvement

The agencies convened for the Interagency Scoping Meeting are to be convened throughout the project study for regular updates. Their input will be sought on environmental and regulatory matters as the project proceeds. A field tour will be proposed early in the study in order to familiarize them with the potential corridors for consideration.



4.0 SUMMARY OF COMMENTS MADE DURING SCOPING PROCESS

4.1 PUBLIC COMMENTS

More than 150 comments were received through e-mail or submitted comment cards before the July 31, 2003 deadline. The most frequently occurring comments are summarized below and a response to the comment is shown. The comment form and the record of individual comments are included in Appendix #10.

Comment: Ten commenters urged that the Red Line be grade separated without specifying a preferred mode.

Response: The 2002 Regional Plan discussed separation of transit from street traffic as a means to provide a speedy and reliable trip that can compete with auto travel. These comments on the Red Line reinforce that thinking.

Comment: Consider Heavy Rail (Metro Subway) as a mode alternative. There were thirty-one comments urging for reconsideration HRT (Metro Subway) as a mode alternative for the Red Line. Some argue that HRT should not be ruled out early in the project, while others argued that HRT is their preferred mode for the Red Line.

Response: The MTA has considered these comments and provided an analysis of heavy rail (Metro) as a modal alternative in the Red Line Corridor Study in a brief paper provided in Appendix #11.

Comment: **BRT as a mode alternative.** Numerous comments were received both in support of and in opposition to BRT as a mode alternative for the Red Line. In support of BRT, stakeholders noted a lower construction cost as a reason to consider this alternative. In opposition, stakeholders noted that BRT does not provide the same quality or capacity of service as a rail line and would not facilitate economic growth and revitalization.

Response: MTA will study BRT as a mode alternative for the Red Line. MTA will consider numerous strategies to achieve the traffic and/or grade separation that could make BRT competitive with auto travel at a lesser capital and/or operating cost than fixed-rail alternatives.

Comment: **Impacts of the Project.** There were a variety of comments made regarding the potential impacts of the project. There were comments made about potential environmental, community, and historic site impacts. The potential impact of additional vehicular traffic accessing stations was described as a concern. There were concerns expressed about the availability of



parking at stations and concerns expressed about the loss of on street parking. Specifically, concerns were noted about access to a Security Square Mall or CMS station along Rolling Road in western Baltimore County, overflow parking at the existing West Baltimore MARC station (a potential Red Line station), and the loss of on-street parking with an at-grade alignment in the Fells Point and Patterson Park areas.

Response: Cultural and Environmental Impacts - MTA is preparing a DEIS for this project. In the development of alternatives, efforts will be made to avoid impacts to resources. The potential environmental and cultural resource impacts of each alternative will be identified and considered as part of the evaluation of alternatives. When a preferred alternative is identified, any impacts that cannot be avoided will be mitigated in accordance with regulations.

Traffic Impacts - As part of the DEIS, the MTA will study the transportation impacts of alignment alternatives including potential station locations. Different types of stations are anticipated at different locations. Some stations will have parking and others will not. The Study will include the analysis of existing and forecasted vehicular traffic as well as anticipated transit connections and pedestrian and bicycle accessibility. Transit ridership

projections will be developed. The identification of station locations will include analysis of consistency with adopted land use plans and consultation with local jurisdictions about development opportunities that may result from station development.

Comment: **Consider alternative alignments.** Some commenters requested that MTA consider alignment options along the Frederick Avenue or Wilkens Avenue corridors. It was suggested that such alignments could have fewer negative community impacts, better serve the travel markets, and/or cost less than an Edmondson Avenue/U.S. 40 alignment. Comments were also received stating that southwest Baltimore east of Monroe Street and between Washington Boulevard and U.S. 40 would not be as well served by the Red Line proposed alignments as they would be in a more southerly alignment, Baltimore Street, for example.

There were various specific suggestions made about alignments for consideration. Some commenters urged for tunnels in specific portions of the alignment, some urged for a connection at Charles Center Metro station; others suggested routing alternatives to UMBC, through the Social Security complex area or downtown.



Response: As the study proceeds, new alternatives may arise if a currently proposed alignment is determined to be infeasible due to engineering or other constraints. The long range transit plan for the region shows extension of the Red Line to Canton. The specific alignment for the Red Line in the vicinity of Social Security will be developed in consultation with representatives of Social Security, CMS and other stakeholders in the area.

With regard to use of the Frederick Avenue corridor, MTA will initiate study of possible alignments in this area during the Alternatives Analysis phase of the study. MTA concurs that such an alignment could possibly serve the same travel market (or additional travel markets) at a potentially lower cost or impact. The costs, benefits, and impacts of a Frederick Avenue alignment, east of the Gwynns Falls will be considered as alternatives are evaluated. West of the Gwynns Falls, it is believed that a Frederick Avenue corridor alignment would diminish the ability of the Red Line to serve the Woodlawn/Social Security area in an efficient and effective manner, a principal goal of the project. Further studies of the Frederick Avenue corridor, west of the Gwynns Falls, will not be conducted.

With regard to the Wilkens Avenue corridor, this area is south of the proposed study area and

lacks the density of population and employment available in other alignments further north within the study area. No further studies will be conducted.

Comment: **Eastward expansion of the study area.** Several commenters recommended extending the study area east to Canton, Highlandtown, Bayview, and Dundalk. It was felt that these areas are in great need of service due to proposed growth and development.

Response: The Advisory Committee, which recommended the Red Line as a priority project of the Baltimore Region Transit Plan, recommended that the first phase of the project be between the Woodlawn/Social Security area and the Fells Point/Patterson Park area. The committee agreed that these were logical termini for the project and was the most that could be accomplished in a reasonable time-frame and in light of available funding. Future studies will consider Red Line extensions to Bayview, Dundalk, and Canton as recommended by the Baltimore Region Transit Plan.

Comment: **Connectivity.** Many commenters urged that MTA make the best possible connections between and among transit modes such as bus, Light Rail, Metro Subway, and MARC. Comments cited the difficult connection between the Light Rail and Metro Subway at



Lexington Market as a specific example. The need for a direct connection between the Red Line and the West Baltimore MARC station was referenced as a specific example for consideration as the project moves forward.

Response: MTA will make every effort to ensure high-quality connections between the Red Line and other transit modes. The alignments proposed for study include connections between the Red Line and MARC, as well as Light Rail and Metro Subway. A feeder bus service plan will be developed in conjunction with the ridership forecasts for the Red Line. As alternatives are selected for further study, the feasibility of specific connections and how they could be made will be explored.

Comment: **Importance of a commuter-capture station at or near the Beltway on I-70.** Several comments encouraged MTA to place a major park and ride station at or near the Beltway on I-70 in order to capture commuters who would otherwise drive to downtown via U.S. 40, Cooks Lane, Edmondson Avenue, Windsor Mill Road, etc.

Response: A major park and ride station at or near the west end of the Red Line is being considered. MTA will investigate numerous site alternatives that can meet the potential demand for Red Line service.

Comment: **Opposition to any alignment using Gwynns Falls or Leakin Park.**

Response: The MTA is not proposing any at-grade alignments through the western area of Gwynns Falls or Leakin Park. The MTA is studying alignments along U.S. 40 / Edmondson Avenue which would necessarily cross the Gwynns Falls near Hilton Parkway. Detailed environmental evaluations will be conducted regarding this crossing.

Comment: **There were comments stressing the importance of connecting the Red Line to the Gwynns Falls Trail.**

Response: MTA will consider intermodal connections in planning for the Red Line. A connection to the Gwynns Falls Trail can be considered. MTA must also be mindful of Section 4(f) impacts related to the trail; MTA will also consider Section 6(f) impacts related to outdoor recreation resources such as the stream valley.

Comment: **Importance of Moving Ahead with Project Soon.** Several commenters urged that the Red Line project move ahead as soon as possible. Phasing of the project was suggested to keep progress going. Some suggestions for funding the project were made. Some of the commenters volunteered to participate in a



committee for the project and provided their contact information.

Response: The State's priorities for transportation project funding are identified in the CTP each year. The State will also need to seek Federal Funds for the project.

4.2 ELECTED OFFICIAL COMMENTS

Letters were received from elected officials during the Scoping Period. Key points from these letters are noted below:

Maryland General Assembly- House Delegation Comments:

- It is critical that The Baltimore Regional Rail (Transit) Plan be included in the state's transportation reauthorization request.
- The State should submit the entire rail plan, with emphasis on the Red Line and Green Line portions of the plan. The reauthorization request should allow for the continuation of the development of the entire system, and provide the possibility of funding for the initial construction within the six-year reauthorization period.
- The Baltimore region's citizens have long suffered from an inadequate mass transit system. They cannot afford any further delay or further relegation to "second tier" status among the state's transit priorities.

Baltimore City State Senate Delegation Comments:

- The Senate Delegation is committed to working with the state to secure the state and federal funds necessary to advance the planning and construction of the Red and Green Lines during the current reauthorization period.
- The delegation urges that a supplemental appropriation request of four million dollars be made for FY 2004 to support planning studies for the Red and Green Lines. Further requests that future appropriations be equitable with other transit projects in the state.

Mayor's Office- City of Baltimore Comments:

- Appreciates the decision to include the Baltimore Regional Rail (Transit) Plan in the reauthorization request. The State needs to show further commitment to the Red and Green Lines by providing additional State planning funds in the CTP for FY 2005-2010.
- Requests that at least \$15 million in additional funding be provided for the Red Line.
- Baltimore-area projects need a significant increase in funding to reach the point of being considered for engineering and construction. The State must ensure that both of Maryland's urban cores have first rate transportation systems.

A letter from the elected officials that comprise the Baltimore Metropolitan Council is included as Appendix #1.



4.3 FEDERAL, STATE AND LOCAL AGENCY COMMENTS

Letters were received from three government agencies during the Scoping Period. Refer to Appendix # 12 for the actual letters. Key points made in these agencies correspondence are noted below:

MARYLAND DEPARTMENT OF PLANNING COMMENTS

- Economic Development and opportunities for transit oriented development should be key factors in selecting transit station locations.
- MDOT and MTA are urged to acquire key parcels of land for use as future transit station locations and eventual TOD development.
- MDP supports local jurisdiction development of TOD policies and regulations. MDP supports the City of Baltimore efforts to develop TOD guidelines and policies and will work to coordinate these efforts with the Red Line study.
- MDP urges for frequent communications and agency coordination on the project.

MTA RESPONSE:

The MTA intends to work with Baltimore City and County on station area planning. Locally adopted land use plans and zoning will be an important consideration in determining potential station locations.

The MTA encourages MDP to work with the City on TOD guidelines that can foster development at station locations. MTA will initiate meetings with the City's Department of Planning, and the Department of Housing and Community Development to identify specific locations where development opportunities exist.

Agencies will be kept informed of project status in between the anticipated interagency meetings.

MARYLAND HISTORICAL TRUST COMMENTS

- There are numerous previously surveyed cultural resources in the study corridor and there is a potential for hundreds of resources yet to be identified. It is likely that the undertaking will have adverse effect on historic resources.
- Consultation with Trust is necessary to satisfy the requirements of Section 106 of the National Historic Preservation Act and the Annotated Code of Maryland.

MTA RESPONSE:

MTA will work with the Trust to meet the requirements of Section 106 and State law when a refined set of alternatives is prepared for the Red Line corridor.

THE NATIONAL PARK SERVICE COMMENTS

The National Park Service reviewed the materials and has no issues or concerns at this time.



4.4 OTHER COMMENTS

BALTIMORE CITY DEPARTMENT OF TRANSPORTATION COMMENTS

- The development of the Red Line, an east-west rapid transit line connecting Woodlawn, downtown Baltimore and Southwest waterfront communities ... is necessary to relieve traffic congestion, reduce air pollution, increase accessibility to attractions and employment centers, and support economic growth.
- The Baltimore City Department of Transportation strongly objects to the decision not to consider heavy rail (Metro) as an option when studying mode/alignment alternatives. The existing Light Rail line along Howard Street crosses every major east-west street disrupting the vehicular traffic flow while at the same time being slowed down.
- The Red Line must have grade separation or it will never fulfill the goal of fast and efficient public transportation for Baltimore region residents and will adversely impact north-south vehicular traffic.
- Other than within U.S. Route 40 from Pulaski Street to Martin Luther King Boulevard, there is no roadway capacity to accommodate an exclusive rapid transit lane along existing city streets.

RESPONSE:

- An analysis of heavy rail (Metro) as a modal alternative for the Red Line is provided in Appendix #11.
- Grade separation will be considered where necessary in the corridor study. Other techniques to improve efficiency will also be considered such as queue jumpers and signal prioritization.
- Traffic and engineering studies will help to determine whether or how existing roadways might accommodate the alternatives.

TRANSPORTATION DIVISION, BALTIMORE METROPOLITAN COUNCIL.

The Director of Transportation made the following comments:

- Urge for close coordination with all the local jurisdictions within the Baltimore Region is important.
- Issues such as land use and local traffic impacts are important. For efficiency of automobile and transit circulation, grade separation is encouraged. Coordination with Baltimore City on traffic circulation issues in downtown Baltimore is important.
- The economic development potential of station areas should be a priority in the analysis of alternatives.



- Transit-oriented development plans should be developed in concert with the private sector and local governments.

Response:

- MTA will establish a Technical Advisory Committee which will include local government representatives. The members of this Committee will provide input and advice on many issues and will address technical matters such as traffic.
- Economic and transit-oriented development potential is a key criterion in the selection of a preferred alternative. MTA will consult with Baltimore City and Baltimore County as station locations are under study. TOD planning will commence once station locations have been identified.
- Local traffic issues will be evaluated in the DEIS and coordinated with local governments.



5.0 SCREENING AND RESPONSE TO PUBLIC SCOPING COMMENTS

The specific comments provided on comment cards during the Scoping phase have been compiled in Appendix # 10.

5.1 LEVEL I - COMMENTS OUTSIDE THE SCOPE OF DEIS

Some of the comments received pertain to matters beyond the scope of this project. These include the general comments about transit service and suggested marketing approaches for transit. No reply to these comments is needed at this time.

5.2 LEVEL II - COMMENTS WITHIN THE SCOPE OF DEIS

Section 4 of this report addresses some of the most frequently received comments. A response to individual comments is provided in Appendix # 10. It is intended that the final scoping report will be available for public access. The replies to the comments included in this report will therefore be available to the public. Those who have provided MTA with their names, addresses, or e-mails can be included on the project mail and e-mail list.

Appendix D

Screening of Preliminary Alternatives, May 2005



RED LINE STUDY SCREENING OF PRELIMINARY ALTERNATIVES

May 2005

NOT INTENDED FOR PUBLIC DISTRIBUTION

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SEGMENT A: I-70 West Park & Ride Station to Edmondson Avenue at Swann Avenue
Bus Rapid Transit (BRT) Alternatives

DESCRIPTION OF BRT ALTERNATIVES

The following description summarizes the three BRT alternatives evaluated in the screening of preliminary alternatives for this segment. While variations of the following alternatives have been considered, each of the following was determined to be most representative of the respective alternative within this segment. In further study of the alternatives that are retained, design options will continue to be explored and evaluated as described at the end of this section.

Security Boulevard Alternative

The western terminus of this 5.4-mile alternative would begin adjacent to I-70 approximately one mile west of Rolling Road, where a major park & ride station is proposed. The alignment would extend north at-grade to the Center for Medicare and Medicaid Services (CMS) station area located at the west end of Security Boulevard. The alignment then would follow existing Security Boulevard at-grade east to the existing Security Boulevard/I-70 interchange where a second park & ride station would be constructed at the site of the existing park & ride lot. The alignment would continue south in a tunnel under Brookwood Road to the intersection of Brookwood Road and Edmondson Avenue, turning east onto Edmondson Avenue and ending at the intersection of Edmondson Avenue and North Swann Avenue. The easternmost tunnel portal would be immediately west of an Edmondson Village Shopping Center station.

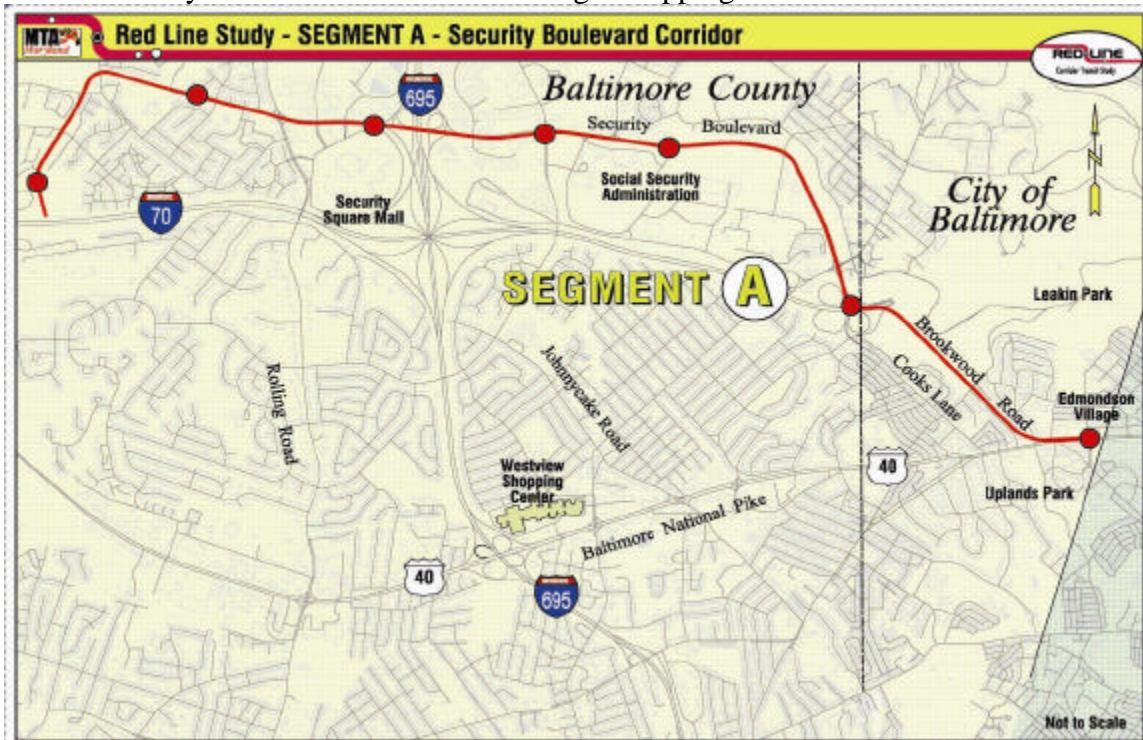


Figure 1: Security Boulevard Alternative from I-70 West Park & Ride Station to Edmondson Avenue at Swann Avenue (BRT)

I-70 Alternative

From a proposed I-70 western park & ride station, the alignment would continue at-grade along I-70. A second park & ride station would be constructed at the site of the existing park & ride lot at the eastern terminus of I-70, near the Security Boulevard/I-70 interchange. The I-70 Alternative then would continue south in a tunnel along Brookwood Road. The alignment would continue toward the intersection of Brookwood Road and Edmondson Avenue, turning east onto Edmondson Avenue and ending at the intersection of Edmondson Avenue and North Swann Avenue. The easternmost tunnel portal would be immediately west of an Edmondson Village Shopping Center station.

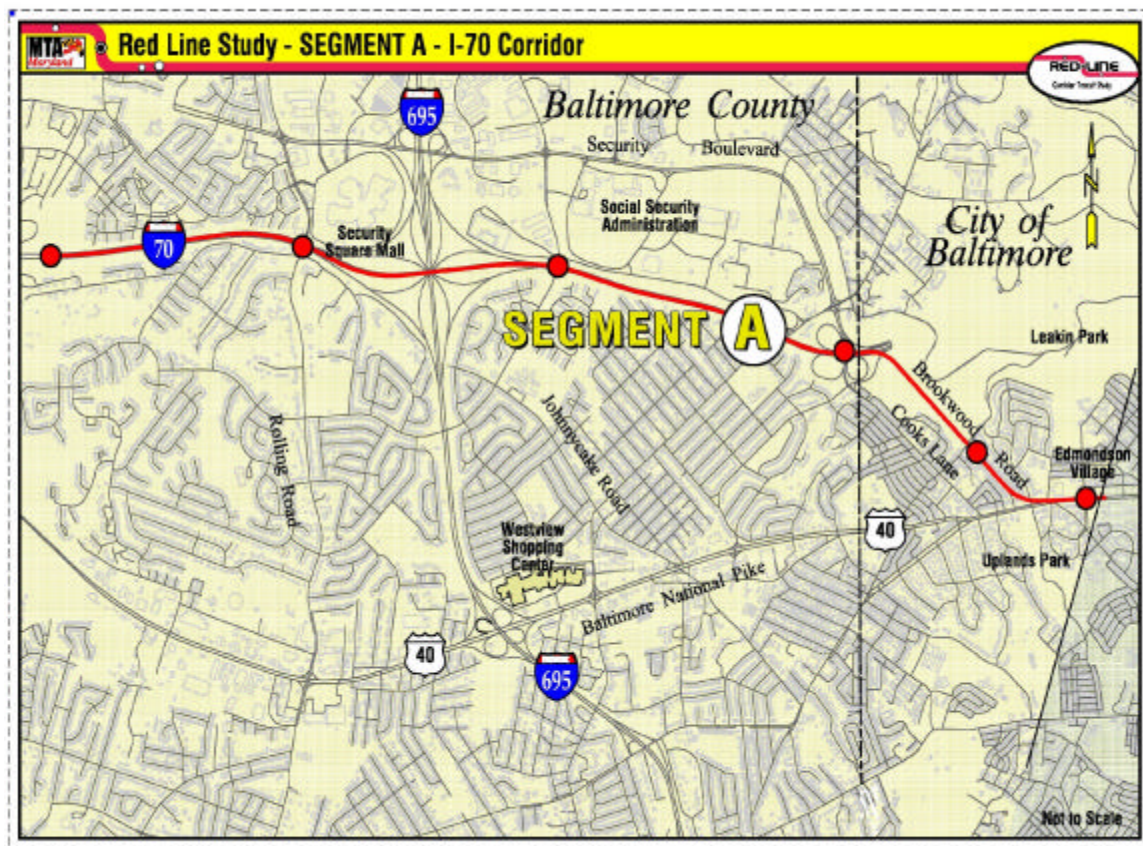


Figure 2: I-70 Alternative from I-70 West Park & Ride Station to Edmondson Avenue at Swann Avenue (BRT)

US 40 Alternative

From a proposed I-70 western park & ride station, the alignment would continue along I-70 at-grade. The alignment would turn south along I-695 in a tunnel, would continue east of the I-695/US 40 interchange and would exit at a tunnel portal onto US 40 immediately east of the interchange. The alternative would continue at-grade along US 40 to the intersection of Edmondson Avenue and North Swann Avenue.

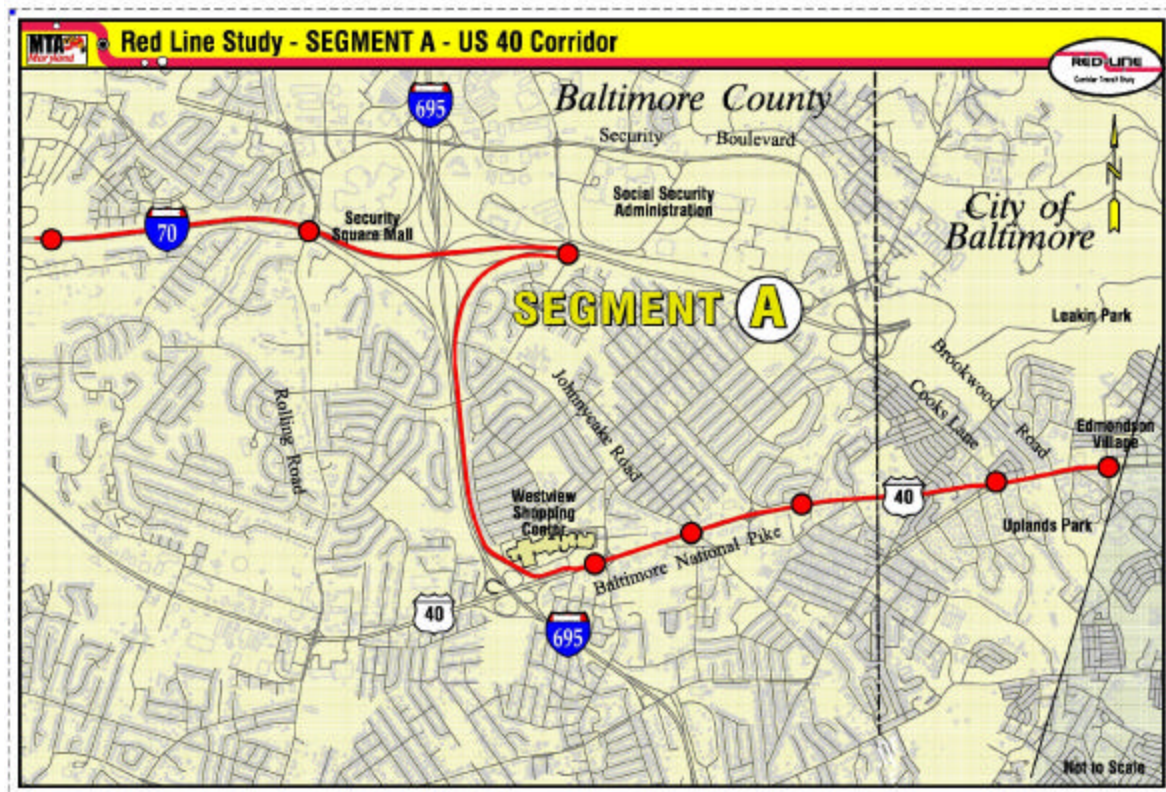


Figure 3: US 40 Alternative from I-70 West Park & Ride Station to Edmondson Avenue at Swann Avenue (BRT)

EVALUATION OF ALTERNATIVES

Evaluation measures have been selected to reflect the various advantages and disadvantages of each alternative. These evaluation measures are being used for screening all preliminary alternatives for the entire Red Line corridor. The measures are also consistent with criteria prescribed in the FTA Project Justification Rating and Evaluation categories (*i.e.*, New Starts) as well as the Red Line Corridor project goals stated in the Purpose and Need. Definitions for the measures are included in the Appendix.

The following table summarizes the data for the Security Boulevard, I-70 and US 40 BRT Alternatives described above. Those measures that have been determined to have appreciable benefits when compared with other alternatives are shaded.

Table 1: Screening of Preliminary Alternatives, I-70 West Park & Ride to Edmondson Avenue at Swann Avenue (BRT)

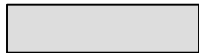
(Note: Shaded cells indicate measure with appreciable benefit.)

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives		
					Security Boulevard	I-70	US 40
					5.4 miles	4.6 miles	7.1 miles
Cost Effectiveness			Engineering Issues	Meets Design Criteria – <i>Yes or description of how criteria not met</i>	Yes	Yes	Yes
			Capital Costs	Preliminary Estimate - <i>millions</i>	\$347 - \$433	\$333 - \$416	\$453 – \$566
Support Community Revitalization and Economic Development	Impacts and Equity	Transit- Supportive Land Use	Population Served	2000 Population within ¼-mile of Alignment	31,539	35,520	44,184
				2025 Population within ¼-mile of Alignment	29,429	33,258	42,780
			Access to Transit	% of Minority Population within ¼-mile of Alignment	72.0%	71.8%	64.0%
				% of Low-Income Population within ¼-mile of Alignment	11.6%	11.2%	9.4%
			Employment Served	2000 People Living within ¼-mile of Alignment Who Are Employed	15,185	17,066	22,030
				2025 People Living within ¼-mile of Alignment Who Are Employed	14,169	15,979	21,330
				2000 Jobs within ¼-mile of Alignment	27,073	16,766	19,500
			Neighborhood Structure	Activity Centers within ¼-mile of Alignment (Neighborhood Shopping Center (and larger), Entertainment District/Tourist Attractions, and Institutions (schools, hospitals, etc.))	9	7	12
				Significant Barrier to Walkability/Access - <i>Yes/No</i>	No	Yes I-70	Yes I-70, I-695
				Potential for Stations (<i>i.e.</i> , Quantity and Quality of Access) - <i>Low/Medium/High</i>	High	Medium	Medium
				Housing Density within a ¼-mile of Alignment – <i>Average # of Dwelling Units per Acre</i>	5.0	4.8	5.0

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives		
					Security Boulevard	I-70	US 40
					5.4 miles	4.6 miles	7.1 miles
Support Community Revitalization and Economic Development	Impacts and Equity	Transit-Supportive Land Use	Development Opportunity	Presence of Empowerment Zones/Enterprise Zones/SNAPs/Revitalization Districts within a ¼ mile of Alignment – Yes/No	No	No	No
				Potential for Development within a ¼-mile of Alignment – <i>Low/Medium/High</i>	Medium	Medium	Medium
				Approved development - <i>Square footage or number of units of new office and retail, number of new residential units within ¼-mile of alignment</i>	1 SFD = 2.395 Ac; 1 Commercial = 0.761 Ac; 1 Commercial = 7.1 Ac (122,016 SF Bldg); 1 Commercial = 16.5 Ac (182,947 SF Bldg); 1 Commercial = 60.5 Ac; Uplands (residential)	1 Commercial = 2.1 Ac; ; Uplands (residential)	1 Commercial = 0.925 Ac (3,848 SF Bldg); 1 Commercial = 2.11 Ac; 1 SFD = 1.095 Ac; 1 Commercial = 0.2 Ac (3,640 SF Bldg); 1 Commercial = 10.6 Ac; 1 Commercial = 2.98 Ac; ; Uplands (residential)
			Transit-Oriented Development (TOD) Opportunity	Potential Sites for TOD and Renaissance Opportunities	3	1	2
Environmental Stewardship	Impacts and Equity	Environmental Benefits	Cultural Resources	Historic Districts within Area of Potential Effect (APE) (w/ elevated sensitivity)	5 (4)	4(3)	7 (3)
				Individual Historic Properties within APE (w/ elevated sensitivity)	5 (3)	4(3)	10 (6)
				Known Archeological Resources within APE	0	0	0
			Parklands	Number of Potentially Impacted Urban Lots	0	0	0
				Number of Potentially Impacted Passive Parks	0	0	0
				Number of Potentially Impacted Play Lots	0	0	0
				Number of Potentially Impacted Regional Parks	1 (via tunnel)	1 (via tunnel)	0
			Number of Potentially Impacted Open Spaces	1 - edge impact	0	1 - edge impact	
			Noise	Potential for Impact to Receptors along Alignment (houses, churches, hospitals, parks, etc.) – <i>Low/Medium/High</i>	Low	Low	Low
Wetlands	Type (Potential for Impacts)	Forested (Low)	Forested (Low)	Forested (Low)			

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives		
					Security Boulevard	I-70	US 40
					5.4 miles	4.6 miles	7.1 miles
Environmental Stewardship	Impacts and Equity	Environmental Benefits	Streams	Crossings	2	2	2
			Forests	Crossing(s) - <i>Linear Feet</i>	8,250	8,500	8,500
			100-Year Floodplains	Crossing(s) - <i>Linear Feet</i>	265-5,500 (Perimeter Dr. – Forest Park Ave.)	400	500
			Hazardous Material Sites	Potential Sites (Potential Risk)	5 (Moderate) 0 (Severe)	2 (Moderate) 0 (Severe)	8 (Moderate) 4 (Severe)
			Rare, Threatened & Endangered Species Habitat	Area of Potential Habitat - <i>Acres</i>	0	0	0
Improve Transit System Connectivity	Effectiveness	Mobility and Operating Efficiencies	Intermodal Connections	Connection to Existing Metro, MARC or Light Rail – <i>Yes/No/Not Applicable (N/A)</i>	N/A	N/A	N/A
				Existing Bus Routes along Alignment	6	3	3
				Buses on Bus Routes along Alignment- <i># per day</i>	545	323	323
				Existing Bus Routes Intersected	2	2	2
				Buses on Intersecting Bus Routes - <i># per day</i>	61	95	185
				Estimated Transit Travel Time - <i>minutes</i>	19.0	9.0	19.5
				Potential Location along the Alignment for a Major Park & Ride – <i>Yes/No</i>	Yes	Yes	Yes
				Existing Pedestrian Level of Service (LOS) along Alignment	B-F	B-C	B-E
				Existing Bicycle LOS along Alignment	E	E	E-F
				Access to Existing/Planned Bicycle Trails along Alignment – <i>Yes/No</i>	Yes	Yes	No
Improve Mobility, Efficiency and Accessibility	Effectiveness	Mobility and Operating Efficiencies	Transit Dependency	2000 Zero-Car Households within ¼-mile of Alignment	2,276	2,346	2,515
				2000 Households within ¼-mile of Alignment	14,044	15,570	20,267
				2000 Senior Citizens within ¼-mile of Alignment	3,016	3,394	5,005
				2000 School-Aged Children within ¼-mile of Alignment	3,743	4,261	4,828

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives		
					Security Boulevard	I-70	US 40
					5.4 miles	4.6 miles	7.1 miles
Improve Mobility, Efficiency and Accessibility	Effectiveness	Mobility and Operating Efficiencies	Traffic Characteristics	Intersections (signalized and unsignalized) along Alignment	19	0	20
				Signalized Intersections along Alignment	10	0	12
				Major Intersections along Alignment	5	0	3
				Average Daily Traffic along Alignment – <i>Vehicles per day</i>	29,000 – 57,000	15,000 – 94,000	94,000/30,000 – 55,000
				Travel Lanes in Peak Direction	2 - 3	2 - 3	3
				Existing Minimum Curb-to-Curb Width along Alignment – <i>Feet</i>	48	112	88
				Existing Minimum Right-of-Way Width along Alignment – <i>Feet</i>	95	260	150
				On-Street Parking – <i>Yes or No, length of parking eastbound (EB), length of parking westbound (WB)</i>	Yes EB = 0.4 mi. WB = 0.0 mi.	No	Yes EB = 0.6 mi. WB = 0.3 mi.



Evaluation Measure with Benefit

The following table highlights the evaluation measures only for which it was determined there is appreciable difference among alternatives. For these measures, the shaded cells indicate those with appreciable benefit compared with the other alternatives.

Table 2: Summary of Evaluation Criteria and Measures with Appreciable Benefit, I-70 West Park & Ride to Edmondson Avenue at Swann Avenue (BRT)

Evaluation Criteria	Evaluation Measures	BRT Alternatives		
		Security Blvd.	I-70	US 40
		5.4 mi.	4.6 mi.	7.1 mi.
Capital Costs	Preliminary Estimate, <i>millions</i>	\$347 - \$433	\$333 - \$416	\$453 - \$566
Population Served	2000 Population w/in ¼-mile	31,539	35,520	44,184
	2025 Population w/in ¼-mile	29,429	33,258	42,780
Employment Served	2000 People Living within ¼-mile of Alignment Who Are Employed	15,185	17,066	22,030
	2025 People Living within ¼-mile of Alignment Who Are Employed	14,169	15,979	21,330
	2000 Jobs w/in ¼-mile	27,073	6,459	9,193
Neighborhood Structure	Significant Barrier to Walkability/Access	No	Yes I-70	Yes I-70, I-695
	Potential for Stations (<i>i.e.</i> , Quantity and Quality of Access)	High	Medium	Medium
Development Opportunity	Approved Development	1 SFD = 2.395 Ac; 1 Commercial = 0.761 Ac; 1 Commercial = 7.1 Ac (122,016 SF Bldg); 1 Commercial = 16.5 Ac (182,947 SF Bldg); 1 Commercial = 60.5 Ac; Uplands (residential)	1 Commercial = 2.1 Ac; Uplands (residential)	1 Commercial = 0.925 Ac (3,848 SF Bldg); 1 Commercial = 2.11 Ac; 1 SFD = 1.095 Ac; 1 Commercial = 0.2 Ac (3,640 SF Bldg); 1 Commercial = 10.6 Ac; 1 Commercial = 2.98 Ac; Uplands (residential)
Transit-Oriented Development (TOD) Opportunity	Potential TOD Sites and Renaissance Opportunities	3	1	2
Cultural Resources	Individual Historic Properties within APE (w/ elevated sensitivity)	5 (3)	4(3)	10 (6)
Parklands	Number of Potentially Impacted Regional Parks	1 (via tunnel)	1 (via tunnel)	0
Hazardous Material Sites	Potential Sites (Potential Risk)	5 (Moderate) 0 (Severe)	2 (Moderate) 0 (Severe)	8 (Moderate) 4 (Severe)
Intermodal Connections	Existing Bus Routes along Alignment	6	3	3
	Buses on Bus Routes along Alignment- # <i>per day</i>	545	323	323
	Buses on Intersecting Routes	61	95	185

Evaluation Criteria	Evaluation Measures	BRT Alternatives		
		Security Blvd.	I-70	US 40
		5.4 mi.	4.6 mi.	7.1 mi.
Intermodal Connections	Estimated Transit Travel Time, <i>minutes</i>	19.0	9.0	19.5
	Access to Existing/Planned Bike Trails	Yes	Yes	No
Transit Dependency	2000 Households w/in ¼-mile	14,044	15,570	20,267
	2000 Senior Citizens w/in ¼-mile	3,016	3,394	5,005
Traffic Characteristics	Intersections along Alignment	19	0	20
	Signalized Intersections	10	0	12
	Major Intersections	5	0	3
	Average Daily Traffic along Alignment	29,000 – 57,000	15,000 – 94,000	94,000/30,000 – 55,000
	Existing Minimum Curb-to-Curb Width, <i>ft.</i>	48	112	88
	Existing Minimum Right-of-Way Width, <i>ft.</i>	95	260	150
	On-Street Parking	Yes EB = 0.4 mi. WB = 0.0 mi.	No	Yes EB = 0.6 mi. WB = 0.3 mi.

Evaluation Measure with Benefit

For each of the evaluation criteria listed above, the following conclusions are made in the comparison of alternatives:

Capital Costs

- The Security Boulevard and I-70 Alternatives are estimated to have approximately \$100 million less in capital cost than the US 40 Alternative.

Population Served

2000 and 2025 Population within ¼-Mile of Alignment

- In 2000, approximately 7,000 to 13,000 more people resided within ¼-mile of the US 40 Alternative alignment than resided near the I-70 or Security Boulevard Alternatives, respectively. Likewise, in 2025, 10,000 to 13,000 more people are projected to live near the US 40 Alternative than near either the I-70 or Security Boulevard Alternatives.

2000 Jobs within ¼-Mile of Alignment

- There are at least three times as many existing jobs within ¼-mile of the Security Boulevard Alternative alignment than are near the other alternatives.

Neighborhood Structure

Significant Barrier to Walkability and Access

- For the Security Boulevard Alternative, Security Boulevard has no significant barrier to walkability or access. In contrast, the fully controlled access of I-70 and I-695 poses such a barrier for the I-70 and US 40 Alternatives, respectively.

Potential for Stations (i.e., Quantity and Quality of Access)

- The Security Boulevard Alternative would have high potential for stations to serve many riders along the alignment.

Development Opportunity

Approved Development

- The Security Boulevard Alternative has at least 90 acres of approved residential and commercial development within a ¼-mile of the alignment, five times more than for either of the other alternatives.

Transit-Oriented Development (TOD) Opportunity

Potential TOD Sites and Renaissance Opportunities

- The Security Boulevard Alternative has one or two more potential sites for transit-oriented development and for Renaissance Opportunities than the other alternatives.

Cultural Resources

Individual Historic Properties within Area of Potential Effect (APE)

- There are at least half as many individual historic properties within the APE (within approximately 1,000 feet of the alignment) for both the Security Boulevard and I-70 Alternatives than for the US 40 Alternative.

Parklands

Number of Potentially Impacted Regional Parks

- In contrast to the other alternatives, the US 40 Alternative would not directly impact any regional parkland, particularly Leakin Park.

Hazardous Material Sites

Potential Sites and Risk

- Both the Security Boulevard and I-70 Alternatives have fewer potential hazardous material sites and associated risk than do the US 40 Alternative.

Intermodal Connections

Existing Bus Routes along Alignment

- There are twice as many bus routes along the alignment of the Security Boulevard Alternative than for the other alternatives.

Buses on Bus Routes along Alignment

- There are over 200 more buses on bus routes along the alignment of the Security Boulevard Alternative than for the other alternatives.

Existing Intersecting Bus Routes

- The US 40 Alternative would intersect two to three times the number of existing bus routes as the other alternatives.

Buses on Intersecting Bus Routes

- The Security Boulevard Alternative would intersect routes with at least 20% more buses per day than would the other alternatives.

Estimated Transit Travel Time

- The I-70 Alternative would have half the estimated travel time for transit than would the other alternatives.

Access to Existing and/or Planned Bicycle Routes

- Both the Security Boulevard and I-70 Alternatives would have access to existing and/or planned bicycle trails.

Transit Dependency

2000 Households within ¼-Mile of Alignment

- There are 4,500 more households within ¼-mile of the US 40 Alternative alignment than are near either of the other alternatives.

2000 Senior Citizens with ¼-Mile of Alignment

- Almost 2,000 more senior citizens reside near the US 40 Alternative than either of the other alternatives.

Traffic Characteristics

Intersections along Alignment

- The I-70 Alternative alignment would not encounter any at-grade intersections by using the existing freeway and a tunnel for its length. This is in contrast to the other alternatives which would encounter numerous intersections along Security Boulevard or US 40.

Average Daily Traffic along Alignment

- There is less total traffic on segments of Security Boulevard and on I-70 east of I-695 thereby reducing the potential for conflict between existing traffic flow and the transitway.

Existing Minimum Curb-to-Curb and Right-of-Way Width

- I-70 has more ample roadway and right-of-way width to accommodate the I-70 Alternative.

On-Street Parking

- There is no on-street parking along the I-70 Alternative alignment therefore avoiding any potential conflicts.

RECOMMENDATION

Based on the above evaluation, it is recommended that the US 40 BRT Alternative from I-70 West Park & Ride to Edmondson Avenue at Swann Avenue not be carried forward for further study. Design option and alternatives within Segment A not specifically evaluated are discussed in the following section.

The rationale for this recommendation is three-fold:

- 1) Based on the evaluation measures, the Security Boulevard and I-70 Alternatives have more positive attributes when compared to the US 40 Alternative. In particular, these alternatives yield:
 - Lower capital cost
 - Faster transit travel time (I-70)
 - More jobs within ¼-mile (Security Boulevard)
 - Higher station potential (Security Boulevard)
 - Lower risk for potential hazardous material sites
 - Fewer potential conflicts with traffic along the alignment (I-70).

- 2) Specific reasons to eliminate the US 40 Alternative include:
 - Longer, more circuitous alignment to reach critical station locations
 - Higher construction cost due in part to a longer tunnel section.
- 3) Furthermore, examination of the advantages unique to the US 40 Alternative does not warrant further study of the alternative because:
 - When considering the other benefits exhibited by the Security Boulevard and I-70 Alternatives, the higher numbers of population, households and senior citizens within a ¼-mile of the US 40 Alternative alignment are not by themselves of such high magnitude to justify further study of US 40.
 - The higher number of buses on intersecting routes is not of such high magnitude to justify further study of the US Alternative.
 - Avoiding impact to Leakin Park could be achieved with other feasible and prudent alternatives. For example, design options for either the Security Boulevard or I-70 Alternative with an alignment different from Brookwood Road could avoid impact to the park property.

The following illustrates the alignment for the alternatives recommended for further study (Security Boulevard and I-70) in contrast to the alternative recommended for no further study (US 40).

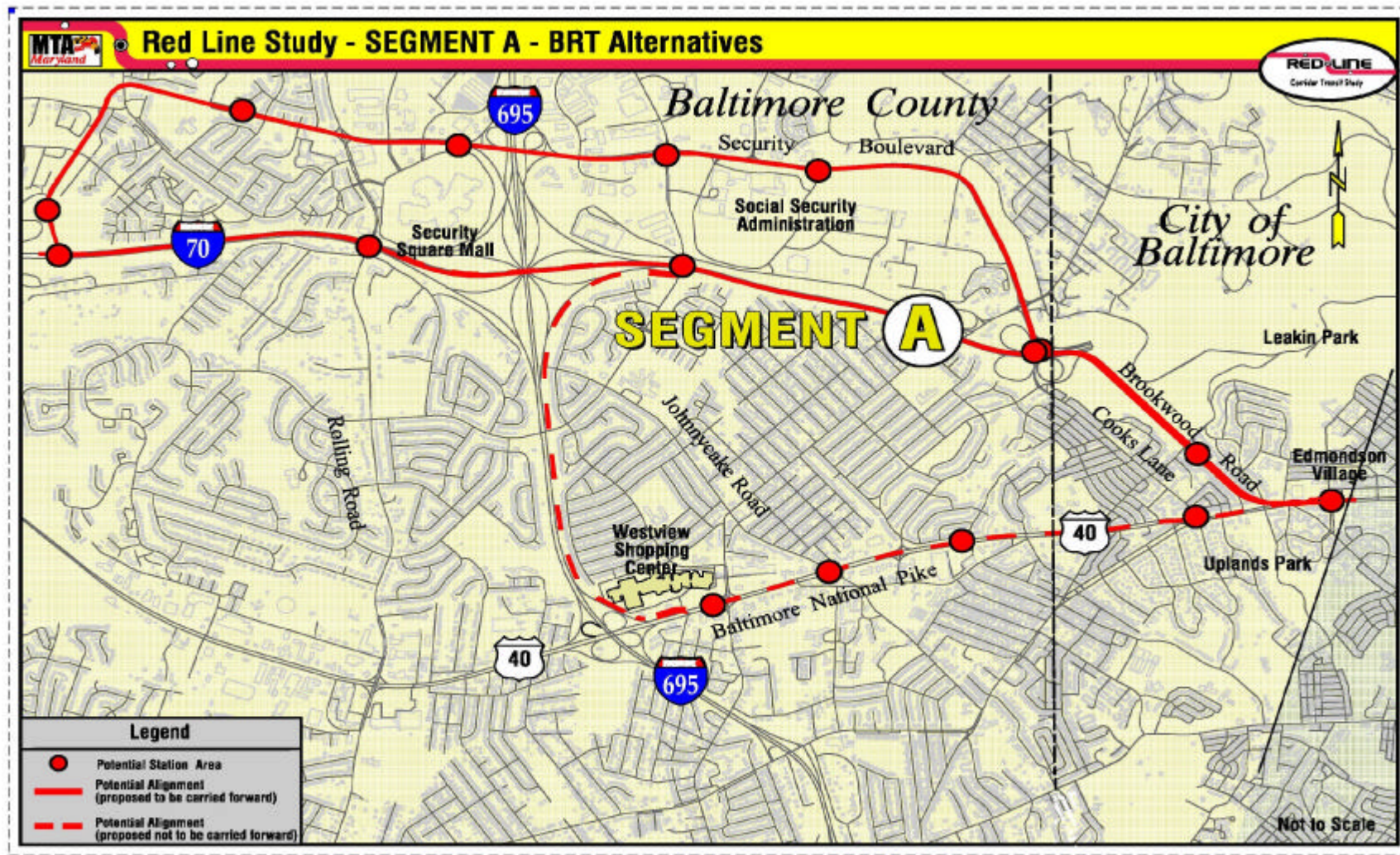


Figure 4: I-70 West Park & Ride to Edmondson Avenue at Swann Avenue BRT Alternatives Recommended for Further Study

OPTIONS NOT CARRIED FORWARD FOR FURTHER STUDY

The following are options to the alternatives evaluated above. These options were not evaluated in the same level of detail but were recommended for no further study as described below.

Rolling Road – from I-70 to US 40

Another option for the US 40 BRT Alternative to reach US 40 from I-70 is via Rolling Road. This is recommended for no further study because it would not serve the major employment center at the Social Security Administration and would have a longer alignment and travel time than other options.

I-695 – from Security Boulevard to I-70

This was proposed as an option for the Security Boulevard Alternative to reach I-70. This option is recommended for no further study because of higher construction costs associated with the existing interchanges at Security Boulevard and I-70 and because other options would serve the Social Security Administration more directly.

Crosby Road – from Rolling Road to Johnnycake Road

This option is recommended for no further study because it would likewise not serve the Social Security Administration directly as other options would and is a longer alignment with more travel time than other options.

OTHER OPTIONS FOR FURTHER STUDY

The following alternatives and options were not evaluated in detail but are recommended for further study.

Cooks Lane – from I-70 to US 40

This is an option to a tunnel under Brookwood Road that was evaluated in detail as part of both the Security Boulevard Alternative and the I-70 Alternative. Both surface and tunnel options on Cooks Lane will be studied further.

Johnnycake Road and Ingleside Avenue – from Woodlawn Drive to US 40

An alternative to either a Brookwood Road tunnel or Cooks Lane alignment (surface or tunnel) is proposed along the Johnnycake Road and Ingleside Avenue alignment. In contrast to the US 40 Alternative, this alignment would have more direct access to the Social Security Administration without the higher costs associated with a long tunnel section. Either the Security Boulevard Alternative or I-70 Alternative would access this alternative via Woodlawn Drive.

Woodlawn Drive – from Security Boulevard to Johnnycake Road

This option would allow the Security Boulevard Alternative or I-70 Alternative to use the Johnnycake Road and Ingleside Avenue option instead of either Brookwood Road or Cooks Lane.

Rolling Road – from Security Boulevard to I-70

This option would allow more direct access to CMS while using the I-70 alignment instead of Security Boulevard.

Security Mall/Social Security Administration – from Rolling Road to I-70

This option allows more direct access to Security Mall and the Social Security Administration.

SEGMENT A: I-70 West Park & Ride Station to Edmondson Avenue at Swann Avenue
Light Rail Transit (LRT) Alternatives

DESCRIPTION OF LRT ALTERNATIVES

The following description summarizes the three LRT alternatives evaluated in the screening of preliminary alternatives for this segment. While variations of the following alternatives have been considered, each of the following was determined to be most representative of the respective alternative within this segment. In further study of the alternatives that are retained, design options will continue to be explored and evaluated as described at the end of this section.

Security Boulevard Alternative

The western terminus of this 5.4-mile alternative would begin adjacent to I-70 approximately one mile west of Rolling Road, where a major park & ride station is proposed. The alignment would extend north at-grade to the Center for Medicare and Medicaid Services (CMS) station area located at the west end of Security Boulevard. The alignment then would follow existing Security Boulevard at-grade east to the existing Security Boulevard/I-70 interchange where a second park & ride station would be constructed at the site of the existing park & ride lot. The alignment would continue south in a tunnel under Brookwood Road to the intersection of Brookwood Road and Edmondson Avenue, turning east onto Edmondson Avenue and ending at the intersection of Edmondson Avenue and North Swann Avenue. The easternmost tunnel portal would be immediately west of an Edmondson Village Shopping Center station.

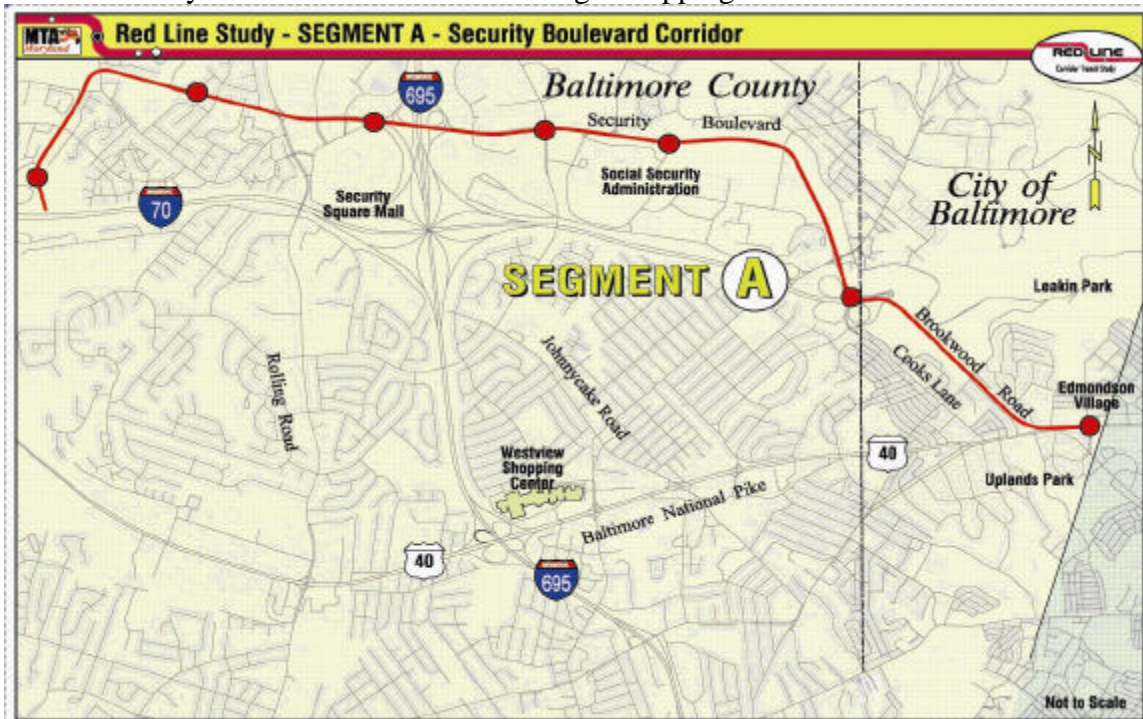


Figure 5: Security Boulevard Alternative from I-70 West Park & Ride Station to Edmondson Avenue at Swann Avenue (LRT)

I-70 Alternative

From a proposed I-70 western park & ride station, the alignment would continue at-grade along I-70. A second park & ride station would be constructed at the site of the existing park & ride lot at the eastern terminus of I-70, near the Security Boulevard/I-70 interchange. The I-70 Alternative then would continue south in a tunnel along Brookwood Road. The alignment would continue toward the intersection of Brookwood Road and Edmondson Avenue, turning east onto Edmondson Avenue and ending at the intersection of Edmondson Avenue and North Swann Avenue. The easternmost tunnel portal would be immediately west of an Edmondson Village Shopping Center station.

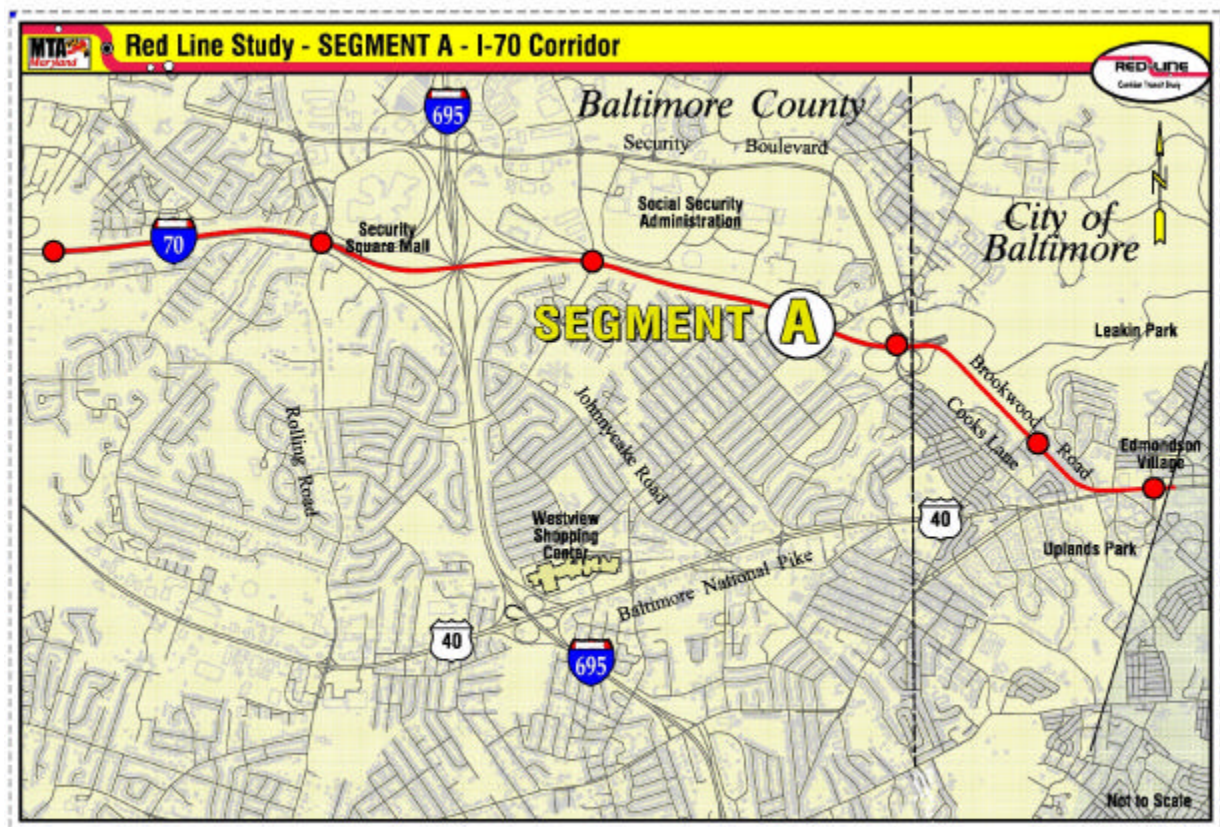


Figure 6: I-70 Alternative from I-70 West Park & Ride Station to Edmondson Avenue at Swann Avenue (LRT)

US 40 Alternative

From a proposed I-70 western park & ride station, the alignment would continue along I-70 at-grade. The alignment would turn south along I-695 in a tunnel, would continue east of the I-695/US 40 interchange and would exit at a tunnel portal onto US 40 immediately east of the interchange. The alternative would continue at-grade along US 40 to the intersection of Edmondson Avenue and North Swann Avenue.

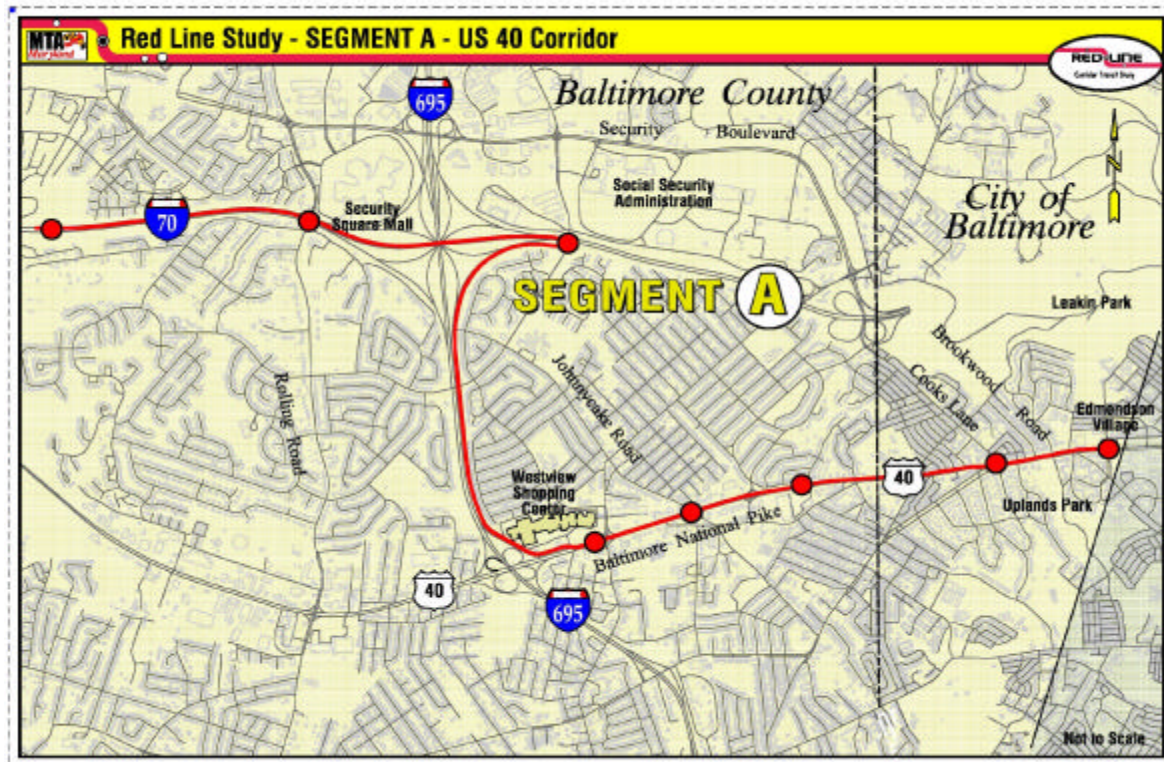


Figure 7: US 40 Alternative from I-70 West Park & Ride Station to Edmondson Avenue at Swann Avenue (LRT)

EVALUATION OF ALTERNATIVES

Evaluation measures have been selected to reflect the various advantages and disadvantages of each alternative. These evaluation measures are being used for screening all preliminary alternatives for the entire Red Line corridor. The measures are also consistent with criteria prescribed in the FTA Project Justification Rating and Evaluation categories (*i.e.*, New Starts) as well as the Red Line Corridor project goals stated in the Purpose and Need. Definitions for the measures are included in the Appendix.

The following table summarizes the data for the Security Boulevard, I-70 and US 40 LRT Alternatives described above. Those measures that have been determined to have appreciable benefits when compared with other alternatives are shaded.

Table 3: Screening of Preliminary Alternatives, I-70 West Park & Ride to Edmondson Avenue at Swann Avenue (LRT)

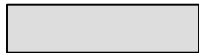
(Note: Shaded cells indicate measure with appreciable benefit.)

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives		
					Security Boulevard	I-70	US 40
					5.4 miles	4.6 miles	7.1 miles
Cost Effectiveness			Engineering Issues	Meets Design Criteria – <i>Yes or description of how criteria not met</i>	Yes	Yes	Yes
			Capital Costs	Preliminary Estimate - <i>millions</i>	\$431 - \$539	\$401 - \$501	\$563 – \$704
Support Community Revitalization and Economic Development	Impacts and Equity	Transit- Supportive Land Use	Population Served	2000 Population within ¼-mile of Alignment	31,539	35,520	44,184
				2025 Population within ¼-mile of Alignment	29,429	33,258	42,780
			Access to Transit	% of Minority Population within ¼-mile of Alignment	72.0%	71.8%	64.0%
				% of Low-Income Population within ¼-mile of Alignment	11.6%	11.2%	9.4%
			Employment Served	2000 People Living within ¼-mile of Alignment Who Are Employed	15,185	17,066	22,030
				2025 People Living within ¼-mile of Alignment Who Are Employed	14,169	15,979	21,330
				2000 Jobs within ¼-mile of Alignment	27,073	16,766	19,500
			Neighborhood Structure	Activity Centers within ¼-mile of Alignment (Neighborhood Shopping Center (and larger), Entertainment District/Tourist Attractions, and Institutions (schools, hospitals, etc.))	9	7	12
				Significant Barrier to Walkability/Access - <i>Yes/No</i>	No	Yes I-70	Yes I-70, I-695
				Potential for Stations (<i>i.e.</i> , Quantity and Quality of Access) - <i>Low/Medium/High</i>	High	Medium	Medium
				Housing Density within a ¼-mile of Alignment – <i>Average # of Dwelling Units per Acre</i>	5.0	4.8	5.0

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives		
					Security Boulevard	I-70	US 40
					5.4 miles	4.6 miles	7.1 miles
Support Community Revitalization and Economic Development	Impacts and Equity	Transit-Supportive Land Use	Development Opportunity	Presence of Empowerment Zones/Enterprise Zones/SNAPs/Revitalization Districts within a ¼ mile of Alignment – Yes/No	No	No	No
				Potential for Development within a ¼-mile of Alignment – <i>Low/Medium/High</i>	Medium	Medium	Medium
				Approved development - <i>Square footage or number of units of new office and retail, number of new residential units within ¼-mile of alignment</i>	1 SFD = 2.395 Ac; 1 Commercial = 0.761 Ac; 1 Commercial = 7.1 Ac (122,016 SF Bldg); 1 Commercial = 16.5 Ac (182,947 SF Bldg); 1 Commercial = 60.5 Ac; Uplands (residential)	1 Commercial = 2.1 Ac; ; Uplands (residential)	1 Commercial = 0.925 Ac (3,848 SF Bldg); 1 Commercial = 2.11 Ac; 1 SFD = 1.095 Ac; 1 Commercial = 0.2 Ac (3,640 SF Bldg); 1 Commercial = 10.6 Ac; 1 Commercial = 2.98 Ac; ; Uplands (residential)
			Transit-Oriented Development (TOD) Opportunity	Potential Sites for TOD and Renaissance Opportunities	3	1	2
Environmental Stewardship	Impacts and Equity	Environmental Benefits	Cultural Resources	Historic Districts within Area of Potential Effect (APE) (w/ elevated sensitivity)	5 (4)	4(3)	7 (3)
				Individual Historic Properties within APE (w/ elevated sensitivity)	5 (3)	4(3)	10 (6)
				Known Archeological Resources within APE	0	0	0
			Parklands	Number of Potentially Impacted Urban Lots	0	0	0
				Number of Potentially Impacted Passive Parks	0	0	0
				Number of Potentially Impacted Play Lots	0	0	0
				Number of Potentially Impacted Regional Parks	1 (via tunnel)	1 (via tunnel)	0
				Number of Potentially Impacted Open Spaces	1 - edge impact	0	1 - edge impact
			Noise	Potential for Impact to Receptors along Alignment (houses, churches, hospitals, parks, etc.) – <i>Low/Medium/High</i>	Low	Low	Low
			Wetlands	Type (Potential for Impacts)	Forested (Low)	Forested (Low)	Forested (Low)

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives		
					Security Boulevard	I-70	US 40
					5.4 miles	4.6 miles	7.1 miles
Environmental Stewardship	Impacts and Equity	Environmental Benefits	Streams	Crossings	2	2	2
			Forests	Crossing(s) - <i>Linear Feet</i>	8,250	8,500	8,500
			100-Year Floodplains	Crossing(s) - <i>Linear Feet</i>	265-5,500 (Perimeter Dr. – Forest Park Ave.)	400	500
			Hazardous Material Sites	Potential Sites (Potential Risk)	5 (Moderate) 0 (Severe)	2 (Moderate) 0 (Severe)	8 (Moderate) 4 (Severe)
			Rare, Threatened & Endangered Species Habitat	Area of Potential Habitat - <i>Acres</i>	0	0	0
Improve Transit System Connectivity	Effectiveness	Mobility and Operating Efficiencies	Intermodal Connections	Connection to Existing Metro, MARC or Light Rail – <i>Yes/No/Not Applicable (N/A)</i>	N/A	N/A	N/A
				Existing Bus Routes along Alignment	6	3	3
				Buses on Bus Routes along Alignment- <i># per day</i>	545	323	323
				Existing Bus Routes Intersected	2	2	2
				Buses on Intersecting Bus Routes - <i># per day</i>	61	95	185
				Estimated Transit Travel Time - <i>minutes</i>	19.0	9.0	19.5
				Potential Location along the Alignment for a Major Park & Ride – <i>Yes/No</i>	Yes	Yes	Yes
				Existing Pedestrian Level of Service (LOS) along Alignment	B-F	B-C	B-E
				Existing Bicycle LOS along Alignment	E	E	E-F
				Access to Existing/Planned Bicycle Trails along Alignment – <i>Yes/No</i>	Yes	Yes	No
Improve Mobility, Efficiency and Accessibility	Effectiveness	Mobility and Operating Efficiencies	Transit Dependency	2000 Zero-Car Households within ¼-mile of Alignment	2,276	2,346	2,515
				2000 Households within ¼-mile of Alignment	14,044	15,570	20,267
				2000 Senior Citizens within ¼-mile of Alignment	3,016	3,394	5,005
				2000 School-Aged Children within ¼-mile of Alignment	3,743	4,261	4,828

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives		
					Security Boulevard	I-70	US 40
					5.4 miles	4.6 miles	7.1 miles
Improve Mobility, Efficiency and Accessibility	Effectiveness	Mobility and Operating Efficiencies	Traffic Characteristics	Intersections (signalized and unsignalized) along Alignment	19	0	20
				Signalized Intersections along Alignment	10	0	12
				Major Intersections along Alignment	5	0	3
				Average Daily Traffic along Alignment – <i>Vehicles per day</i>	29,000 – 57,000	15,000 – 94,000	94,000/30,000 – 55,000
				Travel Lanes in Peak Direction	2 - 3	2 - 3	3
				Existing Minimum Curb-to-Curb Width along Alignment – <i>Feet</i>	48	112	88
				Existing Minimum Right-of-Way Width along Alignment – <i>Feet</i>	95	260	150
				On-Street Parking – <i>Yes or No, length of parking eastbound (EB), length of parking westbound (WB)</i>	Yes EB = 0.4 mi. WB = 0.0 mi.	No	Yes EB = 0.6 mi. WB = 0.3 mi.



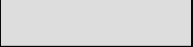
Evaluation Measure with Benefit

The following table highlights the evaluation measures only for which it was determined there is appreciable difference among alternatives. For these measures, the shaded cells indicate those with appreciable benefit compared with the other alternatives.

Table 4: Summary of Evaluation Criteria and Measures with Appreciable Benefit, I-70 West Park & Ride to Edmondson Avenue at Swann Avenue (LRT)

Evaluation Criteria	Evaluation Measures	LRT Alternatives		
		Security Blvd.	I-70	US 40
		5.4 mi.	4.6 mi.	7.1 mi.
Capital Costs	Preliminary Estimate, <i>millions</i>	\$431 - \$539	\$401 - \$501	\$563 - \$704
Population Served	2000 Population w/in ¼-mile	31,539	35,520	44,184
	2025 Population w/in ¼-mile	29,429	33,258	42,780
Employment Served	2000 People Living within ¼-mile of Alignment Who Are Employed	15,185	17,066	22,030
	2025 People Living within ¼-mile of Alignment Who Are Employed	14,169	15,979	21,330
	2000 Jobs w/in ¼-mile	27,073	6,459	9,193
Neighborhood Structure	Significant Barrier to Walkability/Access	No	Yes I-70	Yes I-70, I-695
	Potential for Stations (<i>i.e.</i> , Quantity and Quality of Access)	High	Medium	Medium
Development Opportunity	Approved Development	1 SFD = 2.395 Ac; 1 Commercial = 0.761 Ac; 1 Commercial = 7.1 Ac (122,016 SF Bldg); 1 Commercial = 16.5 Ac (182,947 SF Bldg); 1 Commercial = 60.5 Ac; Uplands (residential)	1 Commercial = 2.1 Ac; Uplands (residential)	1 Commercial = 0.925 Ac (3,848 SF Bldg); 1 Commercial = 2.11 Ac; 1 SFD = 1.095 Ac; 1 Commercial = 0.2 Ac (3,640 SF Bldg); 1 Commercial = 10.6 Ac; 1 Commercial = 2.98 Ac; Uplands (residential)
Transit-Oriented Development (TOD) Opportunity	Potential TOD Sites and Renaissance Opportunities	3	1	2
Cultural Resources	Individual Historic Properties within APE (w/ elevated sensitivity)	5 (3)	4(3)	10 (6)
Parklands	Number of Potentially Impacted Regional Parks	1 (via tunnel)	1 (via tunnel)	0
Hazardous Material Sites	Potential Sites (Potential Risk)	5 (Moderate) 0 (Severe)	2 (Moderate) 0 (Severe)	8 (Moderate) 4 (Severe)
Intermodal Connections	Existing Bus Routes along Alignment	6	3	3
	Buses on Bus Routes along Alignment- # <i>per day</i>	545	323	323
	Buses on Intersecting Routes	61	95	185

Evaluation Criteria	Evaluation Measures	LRT Alternatives		
		Security Blvd.	I-70	US 40
		5.4 mi.	4.6 mi.	7.1 mi.
Intermodal Connections	Estimated Transit Travel Time, <i>minutes</i>	19.0	9.0	19.5
	Access to Existing/Planned Bike Trails	Yes	Yes	No
Transit Dependency	2000 Households w/in ¼-mile	14,044	15,570	20,267
	2000 Senior Citizens w/in ¼-mile	3,016	3,394	5,005
Traffic Characteristics	Intersections along Alignment	19	0	20
	Signalized Intersections	10	0	12
	Major Intersections	5	0	3
	Average Daily Traffic along Alignment	29,000 – 57,000	15,000 – 94,000	94,000/30,000 – 55,000
	Existing Minimum Curb-to-Curb Width, <i>ft.</i>	48	112	88
	Existing Minimum Right-of-Way Width, <i>ft.</i>	95	260	150
	On-Street Parking	Yes EB = 0.4 mi. WB = 0.0 mi.	No	Yes EB = 0.6 mi. WB = 0.3 mi.

 Evaluation Measure with Benefit

For each of the evaluation criteria listed above, the following conclusions are made in the comparison of alternatives:

Capital Costs

- The Security Boulevard and I-70 Alternatives are estimated to have approximately \$50 to \$180 million less in capital cost than the US 40 Alternative.

Population Served

2000 and 2025 Population within ¼-Mile of Alignment

- In 2000, approximately 7,000 to 13,000 more people resided within ¼-mile of the US 40 Alternative alignment than resided near the I-70 or Security Boulevard Alternatives, respectively. Likewise, in 2025, 10,000 to 13,000 more people are projected to live near the US 40 Alternative than near either the I-70 or Security Boulevard Alternatives.

2000 Jobs within ¼-Mile of Alignment

- There are at least three times as many existing jobs within ¼-mile of the Security Boulevard Alternative alignment than are near the other alternatives.

Neighborhood Structure

Significant Barrier to Walkability and Access

- For the Security Boulevard Alternative, Security Boulevard has no significant barrier to walkability or access. In contrast, the fully controlled access of I-70 and I-695 poses such a barrier for the I-70 and US 40 Alternatives, respectively.

Potential for Stations (i.e., Quantity and Quality of Access)

- The Security Boulevard Alternative would have high potential for stations to serve many riders along the alignment.

Development Opportunity

Approved Development

- The Security Boulevard Alternative has at least 90 acres of approved residential and commercial development within a ¼-mile of the alignment, five times more than for either of the other alternatives.

Transit-Oriented Development (TOD) Opportunity

Potential TOD Sites and Renaissance Opportunities

- The Security Boulevard Alternative has one or two more potential sites for transit-oriented development and for Renaissance Opportunities than the other alternatives.

Cultural Resources

Individual Historic Properties within Area of Potential Effect (APE)

- There are at least half as many individual historic properties within the APE (within approximately 1,000 feet of the alignment) for both the Security Boulevard and I-70 Alternatives than for the US 40 Alternative.

Parklands

Number of Potentially Impacted Regional Parks

- In contrast to the other alternatives, the US 40 Alternative would not directly impact any regional parkland, particularly Leakin Park.

Hazardous Material Sites

Potential Sites and Risk

- Both the Security Boulevard and I-70 Alternatives have fewer potential hazardous material sites and associated risk than do the US 40 Alternative.

Intermodal Connections

Existing Bus Routes along Alignment

- There are twice as many bus routes along the alignment of the Security Boulevard Alternative than for the other alternatives.

Buses on Bus Routes along Alignment

- There are over 200 more buses on bus routes along the alignment of the Security Boulevard Alternative than for the other alternatives.

Existing Intersecting Bus Routes

- The US 40 Alternative would intersect two to three times the number of existing bus routes as the other alternatives.

Buses on Intersecting Bus Routes

- The Security Boulevard Alternative would intersect routes with at least 20% more buses per day than would the other alternatives.

Estimated Transit Travel Time

- The I-70 Alternative would have half the estimated travel time for transit than would the other alternatives.

Access to Existing and/or Planned Bicycle Routes

- Both the Security Boulevard and I-70 Alternatives would have access to existing and/or planned bicycle trails.

Transit Dependency

2000 Households within ¼-Mile of Alignment

- There are 4,500 more households within ¼-mile of the US 40 Alternative alignment than are near either of the other alternatives.

2000 Senior Citizens with ¼-Mile of Alignment

- Almost 2,000 more senior citizens reside near the US 40 Alternative than either of the other alternatives.

Traffic Characteristics

Intersections along Alignment

- The I-70 Alternative alignment would not encounter any at-grade intersections by using the existing freeway and a tunnel for its length. This is in contrast to the other alternatives which would encounter numerous intersections along Security Boulevard or US 40.

Average Daily Traffic along Alignment

- There is less total traffic on segments of Security Boulevard and on I-70 east of I-695 thereby reducing the potential for conflict between existing traffic flow and the transitway.

Existing Minimum Curb-to-Curb and Right-of-Way Width

- I-70 has more ample roadway and right-of-way width to accommodate the I-70 Alternative.

On-Street Parking

- There is no on-street parking along the I-70 Alternative alignment therefore avoiding any potential conflicts.

RECOMMENDATION

Based on the above evaluation, it is recommended that the US 40 LRT Alternative from I-70 West Park & Ride to Edmondson Avenue at Swann Avenue not be carried forward for further study.

The rationale for this recommendation is three-fold:

- 1) Based on the evaluation measures, the Security Boulevard and I-70 Alternatives have more positive attributes when compared to the US 40 Alternative. In particular, these alternatives yield:
 - Lower capital cost
 - Faster transit travel time (I-70)
 - More jobs within ¼-mile (Security Boulevard)
 - Higher station potential (Security Boulevard)
 - Lower risk for potential hazardous material sites
 - Fewer potential conflicts with traffic along the alignment (I-70).

- 2) Specific reasons to eliminate the US 40 Alternative include:
 - Longer, more circuitous alignment to reach critical station locations
 - Higher construction cost due in part to a longer tunnel section.
- 3) Furthermore, examination of the advantages unique to the US 40 Alternative does not warrant further study of the alternative because:
 - When considering the other benefits exhibited by the Security Boulevard and I-70 Alternatives, the higher numbers of population, households and senior citizens within a ¼-mile of the US 40 Alternative alignment are not by themselves of such high magnitude to justify further study of US 40.
 - The higher number of buses on intersecting routes is not of such high magnitude to justify further study of the US Alternative.
 - Avoiding impact to Leakin Park could be achieved with other feasible and prudent alternatives. For example, design options for either the Security Boulevard or I-70 Alternative with an alignment different from Brookwood Road could avoid impact to the park property.

The following illustrates the alignment for the alternatives recommended for further study (Security Boulevard and I-70) in contrast to the alternative recommended for no further study (US 40).

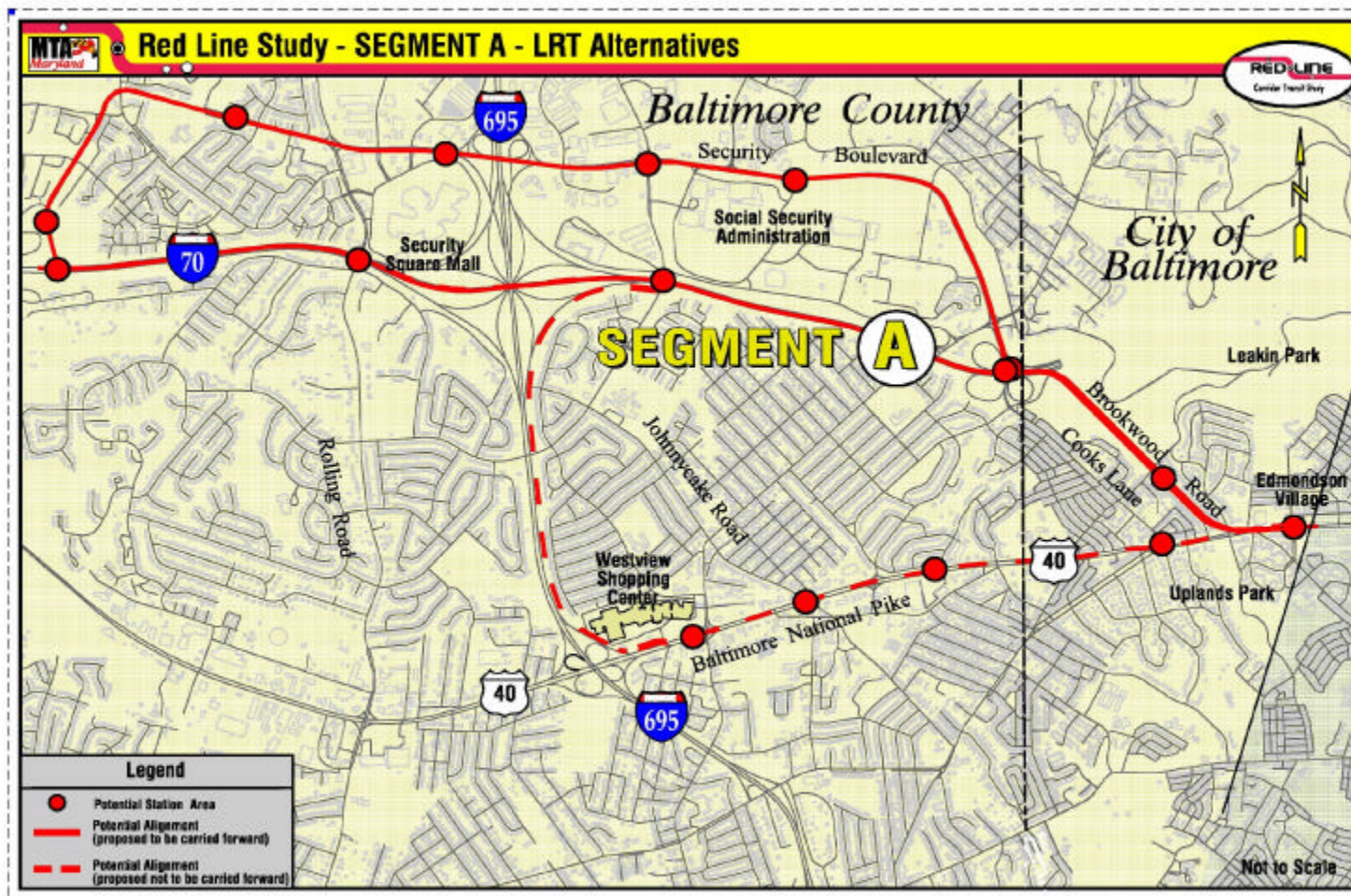


Figure 8: I-70 West Park & Ride to Edmondson Avenue at Swann Avenue LRT Alternatives Recommended for Further Study

OPTIONS NOT CARRIED FORWARD FOR FURTHER STUDY

The following are options to the alternatives evaluated above. These options were not evaluated in the same level of detail but were recommended for no further study as described below.

I-695 – from Security Boulevard to I-70

This was proposed as an option for the Security Boulevard Alternative to reach I-70. This option is recommended for no further study because of higher construction costs associated with the existing interchanges at Security Boulevard and I-70 and because other options would serve the Social Security Administration more directly.

Woodlawn Drive/Crosby Road – from I-70 to Johnnycake Road

This option for serving the Social Security Administration is associated with the US 40 Alternative evaluated in detail and recommended for no further study. It is recommended for no further study for the same reasons as for the US 40 Alternative.

OTHER OPTIONS FOR FURTHER STUDY

The following alternatives and options were not evaluated in detail but are recommended for further study.

Cooks Lane – from I-70 to US 40

This is an option to a tunnel under Brookwood Road evaluated in detail as part of both the Security Boulevard Alternative and the I-70 Alternative. Both a tunnel and surface option will be studied further but with the surface option as a one-way pair in conjunction with Stamford Road (see below).

Stamford Road – from Forest Park Avenue to US 40

This option will be studied as a surface one-way pair in conjunction with Cooks Lane.

Woodlawn Drive – from Security Boulevard to I-70

This option would allow the Security Boulevard Alternative to use I-70 alignment east of the Social Security Administration.

Rolling Road – from Security Boulevard to I-70

This option would allow more direct access to CMS while using the I-70 alignment instead of Security Boulevard.

Security Mall/Social Security Administration – from Rolling Road to I-70

This option allows more direct access to Security Mall and the Social Security Administration.

**SEGMENT B: Edmondson Avenue at Swann Avenue to West Baltimore MARC
Station**
BRT Alternatives

DESCRIPTION OF BRT ALTERNATIVES

The following description summarizes the three BRT alternatives evaluated in the screening of preliminary alternatives for this segment. While variations of the following alternatives have been considered, each of the following was determined to be most representative of the respective alternative within this segment. In further study of the alternatives that are retained, design options will continue to be explored and evaluated as described at the end of this section.

Edmondson Avenue/West Franklin Street Alternative

The western terminus of this alternative would begin at the intersection of Edmondson Avenue and North Swann Avenue. The alignment would extend at-grade along Edmondson Avenue to West Franklin Street, then along West Franklin Street to the West Baltimore MARC Station.

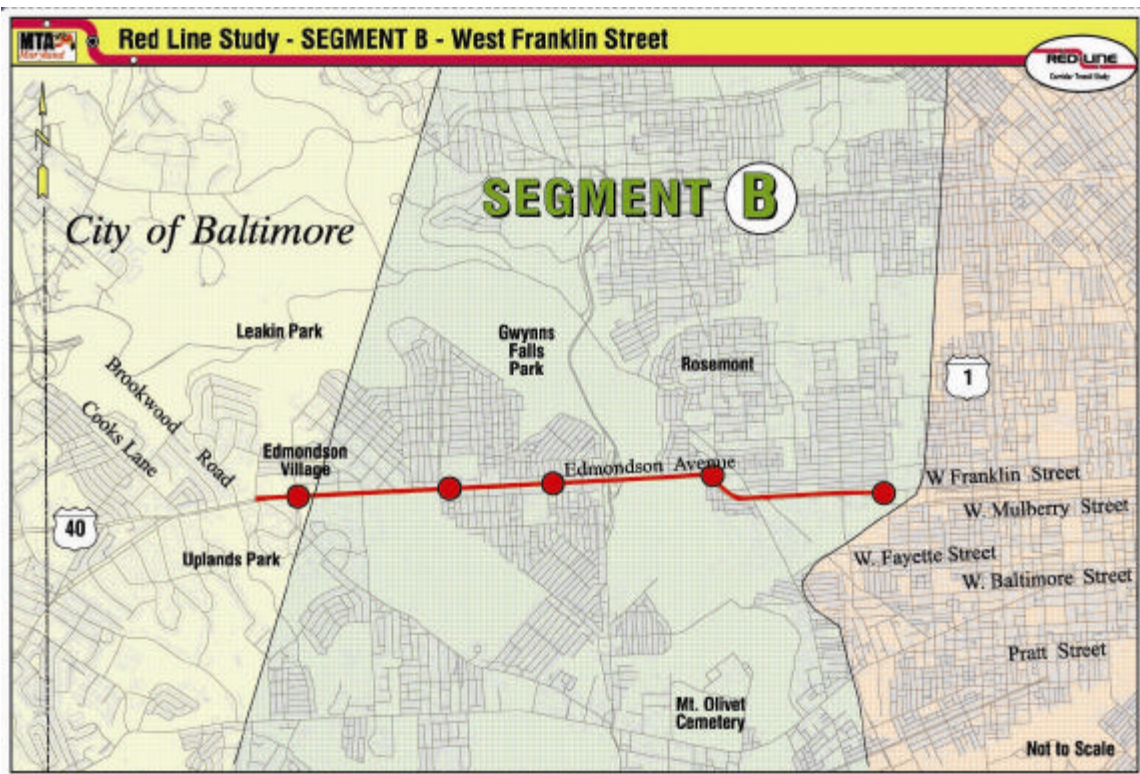


Figure 9: Edmondson Avenue/West Franklin Street Alternative from Edmondson Avenue at Swann Avenue to West Baltimore MARC Station (BRT)

Quarry Alternative

The western terminus of this alternative would begin at the intersection of Edmondson Avenue and North Swann Avenue. The alignment would extend at-grade along Edmondson Avenue to the intersection of North Hilton Street. Immediately east of the Hilton Street intersection, the alignment would turn south and bridge over an abandoned quarry and the Gwynns Falls, and then parallel the Amtrak alignment to the West Baltimore MARC Station.

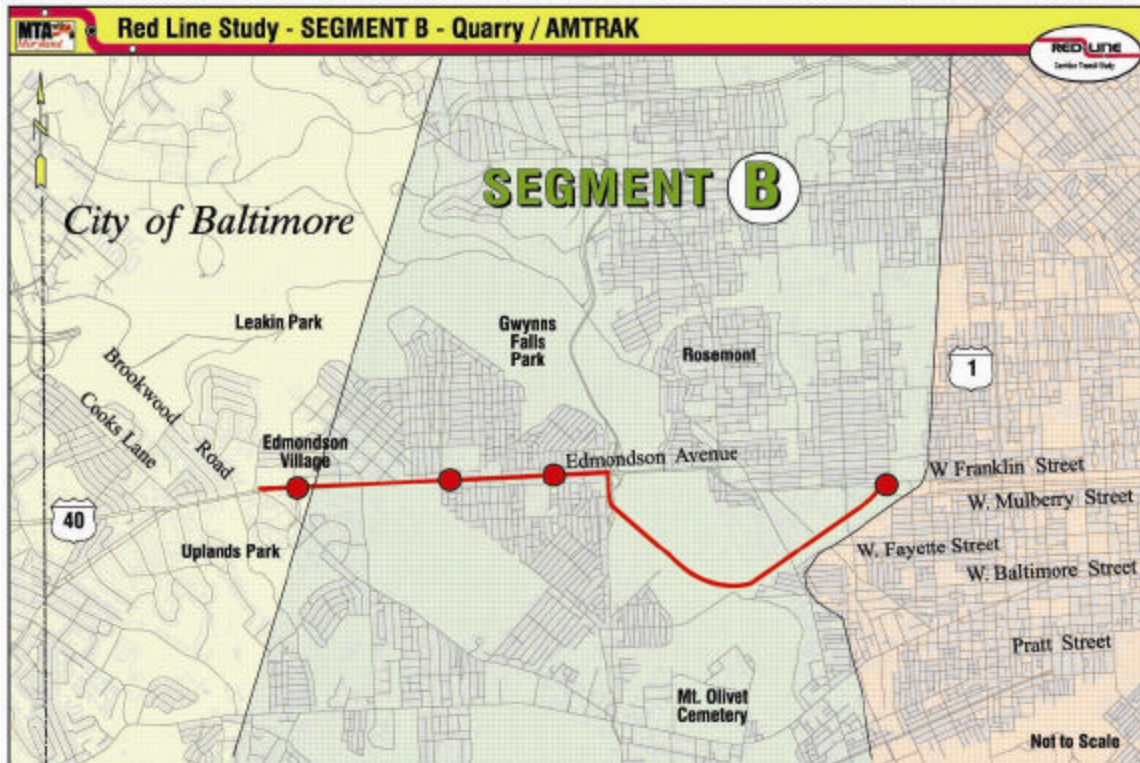


Figure 10: Quarry Alternative from Edmondson Avenue at Swann Avenue to West Baltimore MARC Station (BRT)

Old Frederick Road Alternative

The western terminus of this alternative would begin at the intersection of Edmondson Avenue and North Swann Avenue. The alignment would extend at-grade along Edmondson Avenue to the intersection of North Athol Avenue. At this point the alignment would turn south following North Athol Avenue at-grade to Old Frederick Road. At Old Frederick Road, the alignment would continue east at-grade until it would enter a tunnel west of North Hilton Street. The tunnel would continue under North Hilton Street and the Amtrak alignment, exit the tunnel and proceed at-grade parallel with the Amtrak alignment to either the existing or a relocated West Baltimore MARC Station.

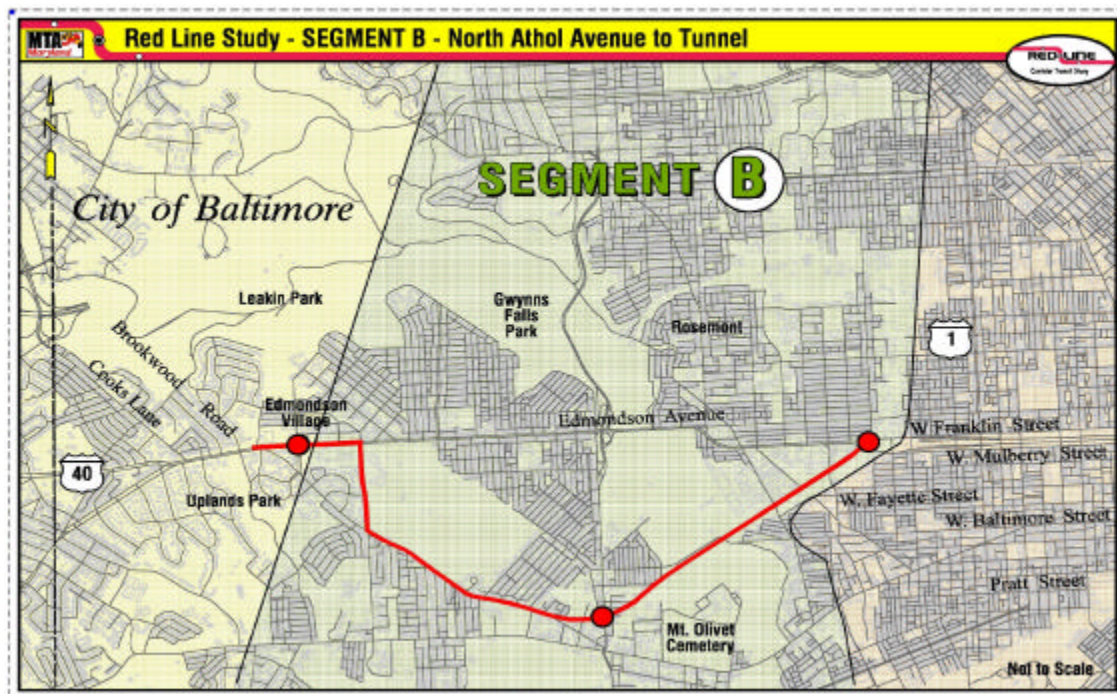


Figure 11: Old Frederick Road Alternative from Edmondson Avenue at Swann Avenue to West Baltimore MARC Station (BRT)

EVALUATION OF ALTERNATIVES

Evaluation measures have been selected to reflect various advantages and disadvantages of each alternative. These evaluation measures are being used for screening all preliminary alternatives for the entire Red Line corridor. The measures are also consistent with criteria prescribed in the FTA Project Justification Rating and Evaluation categories (*i.e.*, New Starts) as well as the Red Line Corridor project goals stated in the Purpose and Need. Definitions for the measures are included in the Appendix.

The following table summarizes the data for the Edmondson Avenue/West Franklin Street, Quarry and Old Frederick Road BRT Alternatives described above. Those measures that have been determined to have appreciable benefits when compared with other alternatives are shaded.

Table 5: Screening of Preliminary Alternatives, Edmondson Avenue at Swann Avenue to West Baltimore MARC Station (BRT)

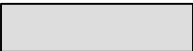
(Note: Shaded cells indicate measure with appreciable benefit.)

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives		
					Edmondson/ W. Franklin	Quarry	Old Frederick
					2.22 miles	2.52 miles	2.87 miles
Cost Effectiveness			Engineering Issues	Meets Design Criteria – <i>Yes or description of how criteria not met</i>	Yes	Yes	Yes
			Capital Costs	Preliminary Estimate - <i>millions</i>	\$52-\$65	\$101-\$126	\$163-\$204
Support Community Revitalization and Economic Development	Impacts and Equity	Transit- Supportive Land Use	Population Served	2000 Population within ¼-mile of Alignment	33,284	37,167	29,062
				2025 Population within ¼-mile of Alignment	31,868	35,582	27,697
			Access to Transit	% of Minority Population within ¼-mile of Alignment	94.8%	94.0%	90.3%
				% of Low-Income Population within ¼-mile of Alignment	24.8%	25.4%	23.3%
			Employment Served	2000 People Living within ¼-mile of Alignment Who Are Employed	11,230	12,529	10,272
				2025 People Living within ¼-mile of Alignment Who Are Employed	10,691	11,995	9,789
				2000 Jobs within ¼-mile of Alignment	2,682	2,953	3,118
			Neighborhood Structure	Activity Centers within ¼-mile of Alignment (Neighborhood Shopping Center (and larger), Entertainment District/Tourist Attractions, and Institutions (schools, hospitals, etc.))	11	12	9
				Significant Barrier to Walkability/Access - <i>Yes/No</i>	No	Yes	Yes
				Potential for Stations (<i>i.e.</i> , Quantity and Quality of Access) - <i>Low/Medium/High</i>	High	Medium	Medium
				Housing Density within a ¼-mile of Alignment – <i>Average # of Dwelling Units per Acre</i>	11.7	11.6	9.5
			Development Opportunity	Presence of Empowerment Zones/Enterprise Zones/SNAPs/Revitalization Districts within a ¼ mile of Alignment – <i>Yes/No</i>	No	No	No
				Potential for Development within a ¼-mile of Alignment – <i>Low/Medium/High</i>	High	Medium	Low
				Approved development - <i>Square footage or number of units of new office and retail, number of new residential units within ¼-mile of alignment</i>	Uplands (residential)		
			Transit-Oriented Development (TOD) Opportunity	Potential Sites for TOD and Renaissance Opportunities	3	2	2

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives		
					Edmondson/ W. Franklin	Quarry	Old Frederick
					2.22 miles	2.52 miles	2.87 miles
Environmental Stewardship	Impacts and Equity	Environmental Benefits	Cultural Resources	Historic Districts within Area of Potential Effect (APE) (w/ elevated sensitivity)	8 (1)	8 (2)	8 (1)
				Individual Historic Properties within APE (w/ elevated sensitivity)	3 (2)	5 (2)	5 (3)
				Known Archeological Resources within APE	0	1	1
			Parklands	Number of Potentially Impacted Urban Lots	0	0	0
				Number of Potentially Impacted Passive Parks	4 (Proximity)	4 (Proximity)	0
				Number of Potentially Impacted Play Lots	4 (Proximity)	3 (Proximity)	1 (Edge)
				Number of Potentially Impacted Regional Parks	1 (Edge)	1 (Bisect)	1 (Edge)
				Number of Potentially Impacted Open Spaces	1 (Edge)	1 (Proximity) 1 (Bisect)	1 (Proximity) 1 (Edge)
			Noise	Potential for Impact to Receptors along Alignment (houses, churches, hospitals, parks, etc.) – <i>Low/Medium/High</i>	Medium	Medium	High
			Wetlands	Type (Potential for Impacts)	Forested(Low)	Forested, Emergent & Open Water(Low)	Forested(Low)
			Streams	Crossings	1	2	3
			Forests	Crossing(s) - <i>Linear Feet</i>	0	2,000	700
			100-Year Floodplains	Crossing(s) - <i>Linear Feet</i>	400	600	750
			Hazardous Material Sites	Potential Sites (Potential Risk)	2 (Moderate) 0 (Severe)	0 (Moderate) 1 (Severe)	0 (Moderate) 1 (Severe)
			Rare, Threatened & Endangered Species Habitat	Area of Potential Habitat – <i>Acres</i>	0	0	0
Improve Transit System Connectivity	Effectiveness	Mobility and Operating Efficiencies	Intermodal Connections	Connection to Existing MARC – <i>Yes/No/Quality of Connection – High/Med/Low</i>	Yes /High	Yes /High	Yes /High
				Connection to Existing Metro – <i>Yes/No/Not Applicable (N/A)</i>	N/A	N/A	N/A
				Connection to Existing Light Rail – <i>Yes/No/Not Applicable (N/A)</i>	N/A	N/A	N/A
				Existing Bus Routes along Alignment	4	3	3
				Buses on Bus Routes along Alignment- <i># per day</i>	435	325	325
				Existing Bus Routes Intersected	1	1	1
				Buses on Intersecting Bus Routes - <i># per day</i>	180	60	60
				Estimated Transit Travel Time - <i>minutes</i>	11.3	10.2	8.1
				Potential Location along the Alignment for a Major Park & Ride – <i>Yes/No</i>	No	No	No

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives		
					Edmondson/ W. Franklin	Quarry	Old Frederick
					2.22 miles	2.52 miles	2.87 miles

Improve Transit System Connectivity	Effectiveness	Mobility and Operating Efficiencies	Intermodal Connections	Existing Pedestrian Level of Service (LOS) along Alignment	B-D	C	C
				Existing Bicycle LOS along Alignment	D-E	E	E
				Access to Existing/Planned Bicycle Trails along Alignment – Yes/No	Yes	Yes	Yes
Improve Mobility, Efficiency and Accessibility	Effectiveness	Mobility and Operating Efficiencies	Transit Dependency	2000 Zero-Car Households within ¼-mile of Alignment	5,001	5,530	4,011
				2000 Households within ¼-mile of Alignment	13,928	15,729	12,068
				2000 Senior Citizens within ¼-mile of Alignment	5,382	5,947	4,165
				2000 School-Aged Children within ¼-mile of Alignment	4,467	5,041	3,808
			Traffic Characteristics	Intersections (signalized and unsignalized) along Alignment	30	18	18
				Signalized Intersections along Alignment	12	8	6
				Major Intersections along Alignment	4	3	2
				Average Daily Traffic along Alignment – <i>Vehicles per day</i>	55,000	55,000	8,000
				Travel Lanes in Peak Direction	3	3	1
				Existing Minimum Curb-to-Curb Width along Alignment – <i>Feet</i>	75	75	25
				Existing Minimum Right-of-Way Width along Alignment – <i>Feet</i>	100	100	40
				On-Street Parking – <i>Yes or No, length of parking eastbound (EB), length of parking westbound (WB)</i>	Yes EB=WB = 2 mi.	Yes EB = WB = 1.2 mi.	Yes EB = 0.4 mi. WB = 0.0 mi.



Evaluation Measure with Benefit

The following table highlights the evaluation measures only for which it was determined there was substantial difference among alternatives. For these measures, the shaded cells indicate those with appreciable benefit compared with the other alternatives.

Table 6: Summary of Evaluation Criteria and Measures with Appreciable Benefit, Edmondson Avenue at Swann Avenue to West Baltimore MARC Station (BRT)

Evaluation Criteria	Evaluation Measures	BRT Alternatives		
		Edmondson/ W. Franklin	Quarry	Old Frederick
		2.22 mi.	2.52 mi.	2.87 mi.
Capital Costs	Preliminary Estimate, <i>millions</i>	\$52-\$65	\$101-\$126	\$163-\$204
Population Served	2000 Population w/in ¼-mile	33,284	37,167	29,062
	2025 Population w/in ¼-mile	31,868	35,582	27,697
Neighborhood Structure	Significant Barrier to Walkability/Access	No	Yes	Yes
	Potential for Stations (<i>i.e.</i> , Quantity and Quality of Access)	High	Medium	Medium
	Housing Density within a ¼-mile of Alignment – <i>Average # of Dwelling Units per Acre</i>	11.7	11.6	9.5
Development Opportunity	Potential for Development within a ¼-mile of Alignment	High	Medium	Low
Cultural Resources	Individual Historic Properties within APE (w/ elevated sensitivity)	3 (2)	5 (2)	5 (3)
	Known Archeological Resources within APE	0	1	1
Parklands	Number of Potentially Impacted Regional Parks	1 (Edge)	1 (Bisect)	1 (Edge)
	Number of Potentially Impacted Open Spaces	1 (Edge)	1 (Proximity) 1 (Bisect)	1 (Proximity) 1 (Edge)
Noise	Potential for Impact to Receptors along Alignment	Medium	Medium	High
Forests	Crossing(s) - <i>Linear Feet</i>	0	2,000	700
Intermodal Connections	Buses on Intersecting Bus Routes - <i># per day</i>	180	60	60
	Estimated Transit Travel Time, <i>minutes</i>	11.3	10.2	8.1
Transit Dependency	2000 Zero-Car Households within ¼-mile of Alignment	5,001	5,530	4,011
	2000 Households w/in ¼-mile	13,928	15,729	12,068
Traffic Characteristics	Intersections along Alignment	30	18	18
	Signalized Intersections	12	8	6
	Average Daily Traffic along Alignment	55,000	55,000	8,000
	Travel Lanes in Peak Direction	3	3	1
	Existing Minimum Curb-to-Curb Width, <i>ft.</i>	75	75	25
	Existing Minimum Right-of-Way Width, <i>ft.</i>	100	100	40
	On-Street Parking	Yes EB=WB = 2 mi.	Yes EB=WB = 1.2 mi.	Yes EB = 0.4 mi. WB = 0.0 mi.



Evaluation Measure with Benefit

For each of the evaluation criteria listed above, the following conclusions are made in the comparison of alternatives:

Capital Costs

- The Edmondson Avenue/West Franklin Street Alternative is estimated to have least \$50 to \$120 million less in capital cost than the Quarry and Old Frederick Road Alternatives.

Population Served

2000 and 2025 Population with 1/4-mile of Alignment

- In both 2000 and 2025, approximately 4,000 to 8,000 more people resided and are projected to reside near the Edmondson Avenue/West Franklin Street and Quarry Alternatives than near the Old Frederick Road Alternative.

Neighborhood Structure

Significant Barrier to Walkability and Access

- Edmondson Avenue and West Franklin Street have no significant barrier to walkability or access for the Edmondson Avenue/West Franklin Street Alternative. In contrast, the Quarry and Old Frederick Road Alternatives have a portion of their alignment parallel to the Amtrak right-of-way which presents a barrier to pedestrians. In addition, a barrier is posed by the bridge over the abandoned quarry and the Gwynns Falls for the Quarry Alternative.

Potential for Stations (i.e., Quantity and Quality of Access)

- The Edmondson Avenue/West Franklin Street Alternative would have high potential for stations to serve many riders along the alignment. The station potential is less for the Quarry Alternative because of the adjacent existing land uses: Gwynns Falls Park, the abandoned quarry and Western Cemetery. Likewise, the Old Frederick Road Alternative would have less station potential because of the adjacent, less dense land uses along the alignment: New Cathedral Cemetery, Mount Olivet Cemetery, Gwynns Falls Park and Western Cemetery.

Housing Density within a 1/4-mile of Alignment

- Both the Edmondson Avenue/West Franklin Street and Quarry Alternatives have higher housing density within a 1/4-mile of the respective alignments.

Development Opportunity

Potential for Development

- The Edmondson Avenue/West Franklin Street Alternative has high potential for development, primarily as re-development opportunities. The potential for the Quarry Alternative is less because a larger proportion of the alignment passes through Gwynns Falls Park. The Old Frederick Road Alternative has low potential for development because of the surrounding existing land use.

Cultural Resources

Individual Historic Properties within the Area of Potential Effect (APE)

- There are two fewer individual historic properties within the Area of Potential Effect (within approximately 1,000 feet of the alignment) for the Edmondson Avenue/West Franklin Street Alternative.

Known Archeological Resources within the Area of Potential Effect (APE)

- There are no known archeological resources within the APE (within approximately 100 feet of the alignment) for the Edmondson Avenue/West Franklin Street Alternative.

Parklands

Number of Potentially Impacted Regional Parks

- The Old Frederick Road Alternative would follow the existing Amtrak alignment and the Edmondson Avenue/West Franklin Street Alternative would use an existing roadway crossing of the Gwynns Falls Park. The Quarry Alternative would introduce a new park crossing and would have more serious impacts to the park.

Number of Potentially Impacted Open Spaces

- The Edmondson Avenue/West Franklin Street Alternative would potentially impact only one designated open space on its edge. The Quarry and Old Frederick Road Alternative would potentially impact two designated open spaces to varying degrees.

Noise

Potential for Impact to Receptors

- Because of the narrow existing roadway right-of-way, proximity to receptors such as homes and the relatively lower noise levels, the Old Frederick Road Alternative would have a higher potential for noise impact.

Forests

Crossings

- The Edmondson Avenue/West Franklin Street Alternative would not cross any forest land because the alignment would use the existing highway corridor for Edmondson Avenue as it crosses Gwynns Falls.

Intermodal Connections

Buses on Intersecting Routes

- There are three times as many buses on intersecting routes for the Edmondson Avenue/West Franklin Street Alternative than are on other alternatives.

Estimated Transit Travel Time

- The Old Frederick Road Alternative would have an estimated transit travel time of more than two minutes faster than either of the other alternatives.

Transit Dependency

2000 Zero-Car Households within ¼-mile of Alignment

- Approximately 1,000-1,500 more households with no automobile are within ¼-mile of the alignment of either the Edmondson Avenue/West Franklin Street or Quarry Alternatives.

2000 Households within ¼-mile of Alignment

- From 2,000 to 3,700 more households are within a ¼-mile of the alignment of either the Edmondson Avenue/West Franklin or Quarry Alternatives.

Traffic Characteristics

Intersections along Alignment

- Twelve fewer at-grade intersections would be encountered for the Quarry or Old Frederick Road Alternative than would be encountered for the Edmondson Avenue/West Franklin Street Alternative.

Signalized Intersections along Alignment

- Four to six fewer signalized intersections would be encountered for the Quarry or Old Frederick Road Alternatives than would be encountered for the Edmondson Avenue/West Franklin Street Alternative.

Average Daily Traffic along Alignment

- Old Frederick Road currently has only a small fraction of the daily traffic that US 40 (Edmondson Avenue) carries thereby reducing the potential for conflict between existing traffic flow and the transitway.

Travel Lanes in Peak Direction

- Edmondson Avenue has more existing travel lanes to accommodate a transitway than does Old Frederick Road.

Existing Minimum Curb-to-Curb and Right-of-Way Width

- Edmondson Avenue has wider roadway and right-of-way. This offers more opportunity to construct a transitway within the roadway.

RECOMMENDATION

Based on the above evaluation, it is recommended that the Quarry and Old Frederick Road BRT Alternatives from Edmondson Avenue at Swann Avenue to the West Baltimore MARC Station not be carried forward for further study.

The rationale for this recommendation is summarized in the following points:

- 1) Based on the evaluation measures, the Edmondson Avenue/West Franklin Street Alternative has more positive attributes when compared to the Quarry and Old Frederick Road Alternatives. In particular, the Edmondson Avenue/West Franklin Street Alternative yields:
 - Lower capital cost
 - No significant barrier to walkability or access
 - High potential for stations
 - Highest housing density within ¼-mile of the alignment

- More peak direction travel lanes
 - Wider existing roadway and right-of-way
- 2) Specific reasons to eliminate the Quarry Alternative include:
- More severe potential impact to Gwynns Falls Park
 - Longer, more circuitous alignment
 - Higher construction cost due to a long bridge and sharing the Amtrak rail corridor
 - Significant barriers to walkability and access and less potential for stations due to the surrounding existing land use
 - More length of forest crossings
- 3) Specific reasons to eliminate the Old Frederick Alternative include:
- Longer, more circuitous alignment
 - Higher construction cost due to a tunnel and sharing the Amtrak rail corridor
 - Due to the surrounding existing land use, significant barriers to walkability and access and less potential for stations
 - Higher potential for noise impact to receptors along the alignment
 - Narrow existing roadway
- 4) Examination of the advantages unique to either the Quarry and Old Frederick Alternatives does not warrant further study of the alternatives because:
- The higher numbers of population (including a higher proportion of minority and low-income population), households and zero-car households within a ¼-mile of the alignment are not by themselves of such high magnitude to justify further study of the Quarry Alternative.
 - Less existing traffic and parking on Old Frederick Road is offset by the narrow available roadway for the transitway.

The following illustrates the alignment for the alternative recommended for further study (Edmondson Avenue/West Franklin Street) in contrast to the alternatives recommended for no further study (Quarry and Old Frederick Road).

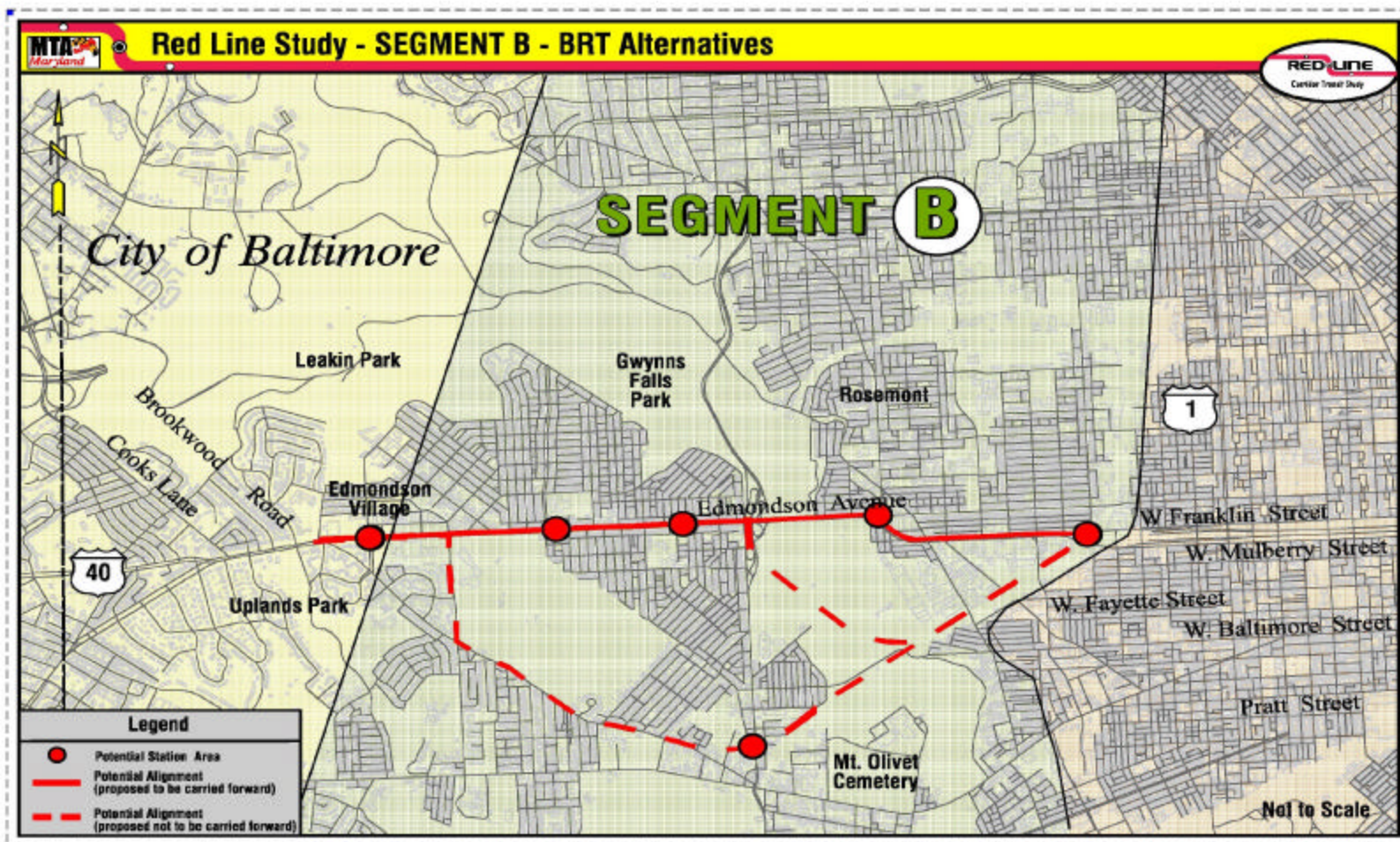


Figure 12: Edmondson Avenue at Swann Avenue to West Baltimore MARC Station BRT Alternatives Recommended for Further Study

OPTION NOT CARRIED FORWARD FOR FURTHER STUDY

The following is an option to the alternatives evaluated above. This option was not evaluated in the same level of detail and is recommended for no further study as described below.

North Swann Avenue-Old Frederick Road to North Athol Avenue

This is an option for the North Athol section of the Old Frederick Road Alternative. Because of its close association with that alternative it is recommended for no further study for the same reasons.

OTHER OPTIONS FOR FURTHER STUDY

The following alternatives and options were not evaluated in detail but are recommended for further study.

Edmondson Avenue – from Swann Avenue to West Baltimore MARC Station

A tunnel alignment along this section is an option to the surface alignment evaluated as part of the Edmondson Avenue/West Franklin Street Alternative.

West Franklin Street – from Walnut and Edmondson Avenues to West Baltimore MARC Station

This is an option to the Edmondson Avenue/West Franklin Street Alternative and will be studied further as a tunnel alignment.

North Franklinton Road -- from W. Franklin Street to MARC

This is an option that would allow access to a relocated West Baltimore MARC Station from the Edmondson Avenue/West Franklin Street Alternative.

North Calverton Road -- from W. Franklin Street to MARC

This is an option similar to the previous option along North Franklinton Road that would allow access to a relocated West Baltimore MARC Station from the Edmondson Avenue/West Franklin Street Alternative.

Edmondson Avenue – from W. Franklin Street to MARC

This is an option to the surface alternative evaluated detail that instead of following US 40/West Franklin Street would extend east along Edmondson Avenue before turning south to the West Baltimore MARC Station.

**SEGMENT B: Edmondson Avenue at Swann Avenue to West Baltimore MARC
Station
LRT Alternatives**

DESCRIPTION OF LRT ALTERNATIVES

The following description summarizes the three LRT alternatives evaluated in the screening of preliminary alternatives for this segment. While variations of the following alternatives have been considered, each of the following was determined to be most representative of the respective alternative within this segment. In further study of the alternatives that are retained, design options will continue to be explored and evaluated as described at the end of this section.

Edmondson Avenue/West Franklin Street Alternative

The western terminus of this alternative would begin at the intersection of Edmondson Avenue and North Swann Avenue. The alignment would extend at-grade along Edmondson Avenue to West Franklin Street, then along West Franklin Street to the West Baltimore MARC Station.

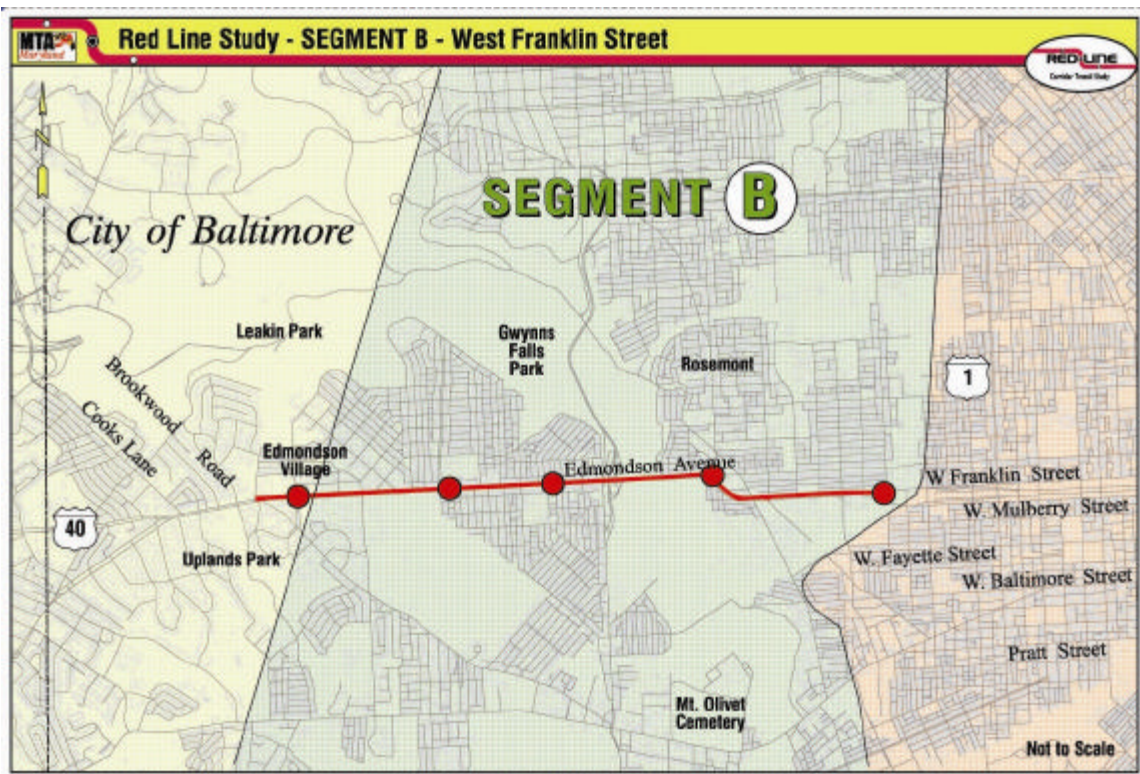


Figure 13: Edmondson Avenue/West Franklin Street Alternative from Edmondson Avenue at Swann Avenue to West Baltimore MARC Station (LRT)

Quarry Alternative

The western terminus of this alternative would begin at the intersection of Edmondson Avenue and North Swann Avenue. The alignment would extend at-grade along Edmondson Avenue to the intersection of North Hilton Street. Immediately east of the Hilton Street intersection, the alignment would turn south and bridge over an abandoned quarry and the Gwynns Falls, and then parallel the Amtrak alignment to the West Baltimore MARC Station.

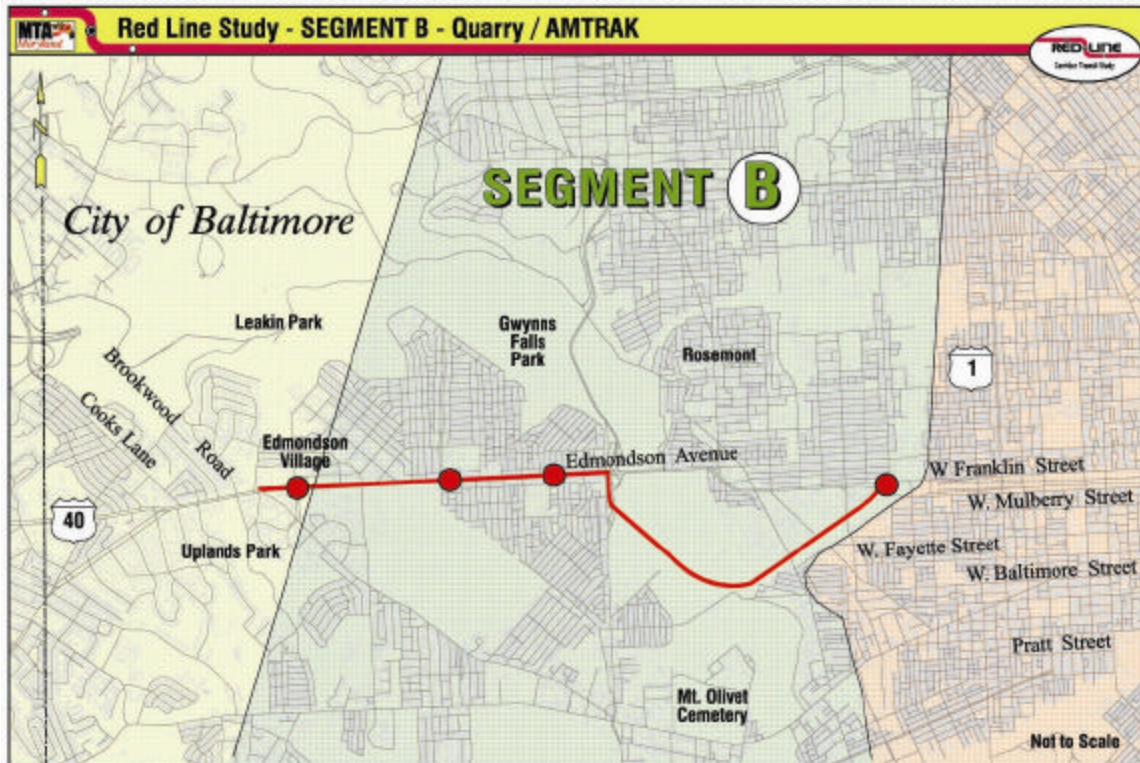


Figure 14: Quarry Alternative from Edmondson Avenue at Swann Avenue to West Baltimore MARC Station (LRT)

Old Frederick Road Alternative

The western terminus of this alternative would begin at the intersection of Edmondson Avenue and North Swann Avenue. The alignment would extend at-grade along Edmondson Avenue to the intersection of North Athol Avenue. At this point the alignment would turn south following North Athol Avenue at-grade to Old Frederick Road. At Old Frederick Road, the alignment would continue east at-grade until it would enter a tunnel west of North Hilton Street. The tunnel would continue under North Hilton Street and the Amtrak alignment, exit the tunnel and proceed at-grade parallel with the Amtrak alignment to either the existing or a relocated West Baltimore MARC Station.

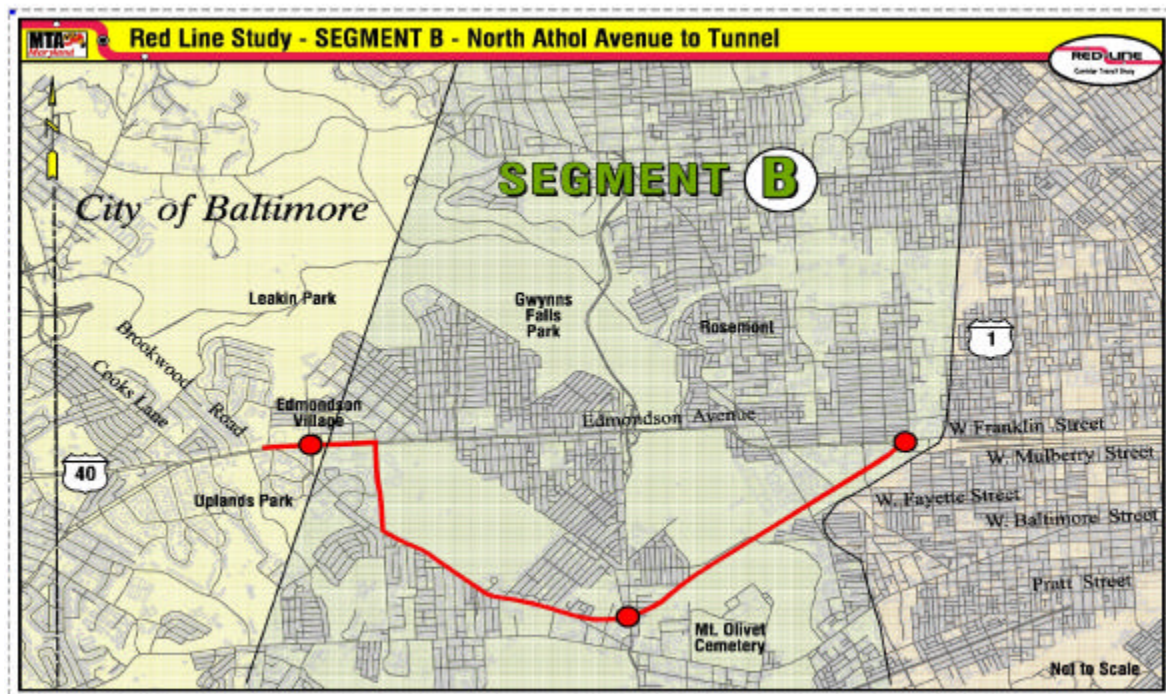


Figure 15: Old Frederick Road Alternative from Edmondson Avenue at Swann Avenue to West Baltimore MARC Station

EVALUATION OF ALTERNATIVES

Evaluation measures have been selected to reflect various advantages and disadvantages of each alternative. These evaluation measures are being used for screening all preliminary alternatives for the entire Red Line corridor. The measures are also consistent with criteria prescribed in the FTA Project Justification Rating and Evaluation categories (*i.e.*, New Starts) as well as the Red Line Corridor project goals stated in the Purpose and Need. Definitions for the measures are included in the Appendix.

The following table summarizes the data for the Edmondson Avenue/West Franklin Street, Quarry and Old Frederick Road LRT Alternatives described above. Those measures that have been determined to have appreciable benefits when compared with other alternatives are shaded.

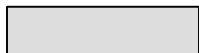
Table 7: Screening of Preliminary Alternatives, Edmondson Avenue at Swann Avenue to West Baltimore MARC Station (LRT)

(Note: Shaded cells indicate measure with appreciable benefit.)

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives		
					Edmondson/ W. Franklin	Quarry	Old Frederick
					<i>2.22 miles</i>	<i>2.52 miles</i>	<i>2.87 miles</i>
Cost Effectiveness			Engineering Issues	Meets Design Criteria – <i>Yes or description of how criteria not met</i>	Yes	Yes	Max. Grade > 6% (N. Athol Ave.)
			Capital Costs	Preliminary Estimate - <i>millions</i>	\$96-\$120	N/A	\$214-\$267
Support Community Revitalization and Economic Development	Impacts and Equity	Transit-Supportive Land Use	Population Served	2000 Population within ¼-mile of Alignment	33,284	37,167	29,062
				2025 Population within ¼-mile of Alignment	31,868	35,582	27,697
			Access to Transit	% of Minority Population within ¼-mile of Alignment	94.8%	94.0%	90.3%
				% of Low-Income Population within ¼-mile of Alignment	24.8%	25.4%	23.3%
			Employment Served	2000 People Living within ¼-mile of Alignment Who Are Employed	11,230	12,529	10,272
				2025 People Living within ¼-mile of Alignment Who Are Employed	10,691	11,995	9,789
				2000 Jobs within ¼-mile of Alignment	2,682	2,953	3,118
			Neighborhood Structure	Activity Centers within ¼-mile of Alignment (Neighborhood Shopping Center (and larger), Entertainment District/Tourist Attractions, and Institutions (schools, hospitals, etc.))	11	12	9
				Significant Barrier to Walkability/Access - <i>Yes/No</i>	No	Yes	Yes
				Potential for Stations (<i>i.e.</i> , Quantity and Quality of Access) - <i>Low/Medium/High</i>	High	Medium	Medium
				Housing Density within a ¼-mile of Alignment – <i>Average # of Dwelling Units per Acre</i>	11.7	11.6	9.5
			Development Opportunity	Presence of Empowerment Zones/Enterprise Zones/SNAPs/Revitalization Districts within a ¼ mile of Alignment – <i>Yes/No</i>	No	No	No
				Potential for Development within a ¼-mile of Alignment – <i>Low/Medium/High</i>	High	Medium	Low
				Approved development - <i>Square footage or number of units of new office and retail, number of new residential units within ¼-mile of alignment</i>	Uplands (residential)		
			Transit-Oriented Development (TOD) Opportunity	Potential Sites for TOD and Renaissance Opportunities	3	2	2

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives		
					Edmondson/ W. Franklin	Quarry	Old Frederick
					2.22 miles	2.52 miles	2.87 miles
Environmental Stewardship	Impacts and Equity	Environmental Benefits	Cultural Resources	Historic Districts within Area of Potential Effect (APE) (w/ elevated sensitivity)	8 (1)	8 (2)	8 (1)
				Individual Historic Properties within APE (w/ elevated sensitivity)	3 (2)	5 (2)	5 (3)
				Known Archeological Resources within APE	0	1	1
			Parklands	Number of Potentially Impacted Urban Lots	0	0	0
				Number of Potentially Impacted Passive Parks	4 (Proximity)	4 (Proximity)	0
				Number of Potentially Impacted Play Lots	4 (Proximity)	3 (Proximity)	1 (Edge)
				Number of Potentially Impacted Regional Parks	1 (Edge)	1 (Bisect)	1 (Edge)
				Number of Potentially Impacted Open Spaces	1 (Edge)	1 (Proximity) 1 (Bisect)	1 (Proximity) 1 (Edge)
			Noise	Potential for Impact to Receptors along Alignment (houses, churches, hospitals, parks, etc.) – <i>Low/Medium/High</i>	Medium	Medium	High
			Wetlands	Type (Potential for Impacts)	Forested(Low)	Forested, Emergent & Open Water(Low)	Forested(Low)
			Streams	Crossings	1	2	3
			Forests	Crossing(s) - <i>Linear Feet</i>	0	2,000	700
			100-Year Floodplains	Crossing(s) - <i>Linear Feet</i>	400	600	750
			Hazardous Material Sites	Potential Sites (Potential Risk)	2 (Moderate) 0 (Severe)	0 (Moderate) 1 (Severe)	0 (Moderate) 1 (Severe)
			Rare, Threatened & Endangered Species Habitat	Area of Potential Habitat – <i>Acres</i>	0	0	0
Improve Transit System Connectivity	Effectiveness	Mobility and Operating Efficiencies	Intermodal Connections	Connection to Existing MARC – <i>Yes/No/Quality of Connection – High/Med/Low</i>	Yes/High	Yes/High	Yes/High
				Connection to Existing Metro – <i>Yes/No/Not Applicable (N/A)</i>	N/A	N/A	N/A
				Connection to Existing Light Rail – <i>Yes/No/Not Applicable (N/A)</i>	N/A	N/A	N/A
				Existing Bus Routes along Alignment	4	3	3
				Buses on Bus Routes along Alignment- <i># per day</i>	435	325	325
				Existing Bus Routes Intersected	1	1	1
				Buses on Intersecting Bus Routes - <i># per day</i>	180	60	60
				Estimated Transit Travel Time - <i>minutes</i>	11.3	10.2	8.1
				Potential Location along the Alignment for a Major Park & Ride – <i>Yes/No</i>	No	No	No

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives		
					Edmondson/ W. Franklin	Quarry	Old Frederick
					2.22 miles	2.52 miles	2.87 miles
Improve Transit System Connectivity	Effectiveness	Mobility and Operating Efficiencies	Intermodal Connections	Existing Pedestrian Level of Service (LOS) along Alignment	B-D	C	C
				Existing Bicycle LOS along Alignment	D-E	E	E
				Access to Existing/Planned Bicycle Trails along Alignment – Yes/No	Yes	Yes	Yes
Transit Dependency			2000 Zero-Car Households within ¼-mile of Alignment	5,001	5,530	4,011	
			2000 Households within ¼-mile of Alignment	13,928	15,729	12,068	
			2000 Senior Citizens within ¼-mile of Alignment	5,382	5,947	4,165	
			2000 School-Aged Children within ¼-mile of Alignment	4,467	5,041	3,808	
			Traffic Characteristics	Intersections (signalized and unsignalized) along Alignment	30	18	18
				Signalized Intersections along Alignment	12	8	6
				Major Intersections along Alignment	4	3	2
				Average Daily Traffic along Alignment – <i>Vehicles per day</i>	55,000	55,000	8,000
Travel Lanes in Peak Direction				3	3	1	
Existing Minimum Curb-to-Curb Width along Alignment – <i>Feet</i>				75	75	25	
Existing Minimum Right-of-Way Width along Alignment – <i>Feet</i>				100	100	40	
On-Street Parking – Yes or No, length of parking eastbound (EB), length of parking westbound (WB)			Yes EB=WB = 2 mi.	Yes EB = WB = 1.2 mi.	Yes EB = 0.4 mi. WB = 0.0 mi.		



Evaluation Measure with Benefit

The following table highlights the evaluation measures only for which it was determined there was substantial difference among alternatives. For these measures, the shaded cells indicate those with appreciable benefit compared with the other alternatives.

Table 8: Summary of Evaluation Criteria and Measures with Appreciable Benefit, Edmondson Avenue at Swann Avenue to West Baltimore MARC Station (LRT)

Evaluation Criteria	Evaluation Measures	LRT Alternatives		
		Edmondson/ W. Franklin	Quarry	Old Frederick
		2.22 mi.	2.52 mi.	2.87 mi.
Engineering Issues	Meets Design Criteria – <i>Yes or description of how criteria not met</i>	Yes	Yes	Max. Grade > 6% (N. Athol Ave.)
Capital Costs	Preliminary Estimate, <i>millions</i>	\$96-\$120	N/A	\$214-\$267
Population Served	2000 Population w/in ¼-mile	33,284	37,167	29,062
	2025 Population w/in ¼-mile	31,868	35,582	27,697
Neighborhood Structure	Significant Barrier to Walkability/Access	No	Yes	Yes
	Potential for Stations (<i>i.e.</i> , Quantity and Quality of Access)	High	Medium	Medium
	Housing Density within a ¼-mile of Alignment – <i>Average # of Dwelling Units per Acre</i>	11.7	11.6	9.5
Development Opportunity	Potential for Development within a ¼-mile of Alignment	High	Medium	Low
Cultural Resources	Individual Historic Properties within APE (w/ elevated sensitivity)	3 (2)	5 (2)	5 (3)
	Known Archeological Resources within APE	0	1	1
Parklands	Number of Potentially Impacted Regional Parks	1 (Edge)	1 (Bisect)	1 (Edge)
	Number of Potentially Impacted Open Spaces	1 (Edge)	1 (Proximity) 1 (Bisect)	1 (Proximity) 1 (Edge)
Noise	Potential for Impact to Receptors along Alignment	Medium	Medium	High
Forests	Crossing(s) - <i>Linear Feet</i>	0	2,000	700
Intermodal Connections	Buses on Intersecting Bus Routes - <i># per day</i>	180	60	60
	Estimated Transit Travel Time, <i>minutes</i>	11.3	10.2	8.1
Transit Dependency	2000 Zero-Car Households within ¼-mile of Alignment	5,001	5,530	4,011
	2000 Households w/in ¼-mile	13,928	15,729	12,068
Traffic Characteristics	Intersections along Alignment	30	18	18
	Signalized Intersections	12	8	6
	Average Daily Traffic along Alignment	55,000	55,000	8,000
	Travel Lanes in Peak Direction	3	3	1
	Existing Minimum Curb-to-Curb Width, <i>ft.</i>	75	75	25
	Existing Minimum Right-of-Way Width, <i>ft.</i>	100	100	40
	On-Street Parking	Yes EB=WB = 2 mi.	Yes EB=WB = 1.2 mi.	Yes EB = 0.4 mi. WB = 0.0 mi.



Evaluation Measure with Benefit

For each of the evaluation criteria listed above, the following conclusions are made in the comparison of alternatives:

Engineering Issues

- The Old Frederick Road Alternative would require grades in excess of 6% along the North Athol Avenue which is not desirable

Capital Costs

- The Edmondson Avenue/West Franklin Street Alternative is estimated to have least \$130 million less in capital cost than the Old Frederick Road Alternative.

Population Served

2000 and 2025 Population with 1/4-mile of Alignment

- In both 2000 and 2025, approximately 4,000 to 8,000 more people resided and are projected to reside near the Edmondson Avenue/West Franklin Street and Quarry Alternatives than near the Old Frederick Road Alternative.

Neighborhood Structure

Significant Barrier to Walkability and Access

- Edmondson Avenue and West Franklin Street have no significant barrier to walkability or access for the Edmondson Avenue/West Franklin Street Alternative. In contrast, the Quarry and Old Frederick Road Alternatives have a portion of their alignment parallel to the Amtrak right-of-way which presents a barrier to pedestrians. In addition, a barrier is posed by the bridge over the abandoned quarry and the Gwynns Falls for the Quarry Alternative.

Potential for Stations (i.e., Quantity and Quality of Access)

- The Edmondson Avenue/West Franklin Street Alternative would have high potential for stations to serve many riders along the alignment. The station potential is less for the Quarry Alternative because of the adjacent existing land uses: Gwynns Falls Park, the abandoned quarry and Western Cemetery. Likewise, the Old Frederick Road Alternative would have less station potential because of the adjacent, less dense land uses along the alignment: New Cathedral Cemetery, Mount Olivet Cemetery, Gwynns Falls Park and Western Cemetery.

Housing Density within a 1/4-mile of Alignment

- Both the Edmondson Avenue/West Franklin Street and Quarry Alternatives have higher housing density within a 1/4-mile of the respective alignments.

Development Opportunity

Potential for Development

- The Edmondson Avenue/West Franklin Street Alternative has high potential for development, primarily as re-development opportunities. The potential for the Quarry Alternative is less because a larger proportion of the alignment passes through Gwynns Falls Park. The Old Frederick Road Alternative has low potential for development because of the surrounding existing land use.

Cultural Resources

Individual Historic Properties within the Area of Potential Effect (APE)

- There are two fewer individual historic properties within the Area of Potential Effect (within approximately 1,000 feet of the alignment) for the Edmondson Avenue/West Franklin Street Alternative.

Known Archeological Resources within the Area of Potential Effect (APE)

- There are no known archeological resources within the APE (within approximately 100 feet of the alignment) for the Edmondson Avenue/West Franklin Street Alternative.

Parklands

Number of Potentially Impacted Regional Parks

- The Old Frederick Road Alternative would follow the existing Amtrak alignment and the Edmondson Avenue/West Franklin Street Alternative would use an existing roadway crossing of the Gwynns Falls Park. The Quarry Alternative would introduce a new park crossing and would have more serious impacts to the park.

Number of Potentially Impacted Open Spaces

- The Edmondson Avenue/West Franklin Street Alternative would potentially impact only one designated open space on its edge. The Quarry and Old Frederick Road Alternative would potentially impact two designated open spaces to varying degrees.

Noise

Potential for Impact to Receptors

- Because of the narrow existing roadway right-of-way, proximity to receptors such as homes and the relatively lower noise levels, the Old Frederick Road Alternative would have a higher potential for noise impact.

Forests

Crossings

- The Edmondson Avenue/West Franklin Street Alternative would not cross any forest land because the alignment would use the existing highway corridor for Edmondson Avenue as it crosses Gwynns Falls.

Intermodal Connections

Buses on Intersecting Routes

- There are three times as many buses on intersecting routes for the Edmondson Avenue/West Franklin Street Alternative than are on other alternatives.

Estimated Transit Travel Time

- The Old Frederick Road Alternative would have an estimated transit travel time of more than two minutes faster than either of the other alternatives.

Transit Dependency

2000 Zero-Car Households within ¼-mile of Alignment

- Approximately 1,000-1,500 more households with no automobile are within ¼-mile of the alignment of either the Edmondson Avenue/West Franklin Street or Quarry Alternatives.

2000 Households within ¼-mile of Alignment

- From 2,000 to 3,700 more households are within a ¼-mile of the alignment of either the Edmondson Avenue/West Franklin or Quarry Alternatives.

Traffic Characteristics

Intersections along Alignment

- Twelve fewer at-grade intersections would be encountered for the Quarry or Old Frederick Road Alternative than would be encountered for the Edmondson Avenue/West Franklin Street Alternative.

Signalized Intersections along Alignment

- Four to six fewer signalized intersections would be encountered for the Quarry or Old Frederick Road Alternatives than would be encountered for the Edmondson Avenue/West Franklin Street Alternative.

Average Daily Traffic along Alignment

- Old Frederick Road currently has only a small fraction of the daily traffic that US 40 (Edmondson Avenue) carries thereby reducing the potential for conflict between existing traffic flow and the transitway.

Travel Lanes in Peak Direction

- Edmondson Avenue has more existing travel lanes to accommodate a transitway than does Old Frederick Road.

Existing Minimum Curb-to-Curb and Right-of-Way Width

- Edmondson Avenue has wider roadway and right-of-way. This offers more opportunity to construct a transitway within the roadway.

RECOMMENDATION

Based on the above evaluation, it is recommended that the Quarry and Old Frederick Road LRT Alternatives from Edmondson Avenue at Swann Avenue to the West Baltimore MARC Station not be carried forward for further study.

The rationale for this recommendation is summarized in the following points:

- 1) Based on the evaluation measures, the Edmondson Avenue/West Franklin Street Alternative has more positive attributes when compared to the Quarry and Old Frederick Road Alternatives. In particular, the Edmondson Avenue/West Franklin Street Alternative yields:
 - Lower capital cost
 - No significant barrier to walkability or access
 - High potential for stations
 - Highest housing density within ¼-mile of the alignment

- More peak direction travel lanes
 - Wider existing roadway and right-of-way
- 2) Specific reasons to eliminate the Quarry Alternative include:
- More severe potential impact to Gwynns Falls Park
 - Longer, more circuitous alignment
 - Likely higher construction cost due to a long bridge and sharing the Amtrak rail corridor
 - Significant barriers to walkability and access and less potential for stations due to the surrounding existing land use
 - More length of forest crossings
- 3) Specific reasons to eliminate the Old Frederick Alternative include:
- Longer, more circuitous alignment
 - Higher construction cost due to a tunnel and sharing the Amtrak rail corridor
 - Due to the surrounding existing land use, significant barriers to walkability and access and less potential for stations
 - Higher potential for noise impact to receptors along the alignment
 - Narrow existing roadway
- 4) Examination of the advantages unique to either the Quarry and Old Frederick Alternatives does not warrant further study of the alternatives because:
- The higher numbers of population (including a higher proportion of minority and low-income population), households and zero-car households within a ¼-mile of the alignment are not by themselves of such high magnitude to justify further study of the Quarry Alternative.
 - Less existing traffic and parking on Old Frederick Road is more of a result of the narrow roadway rather than offering an opportunity for less conflict with existing traffic and parking.

The following illustrates the alignment for the alternative recommended for further study (Edmondson Avenue/West Franklin Street) in contrast to the alternatives recommended for no further study (Quarry and Old Frederick Road).

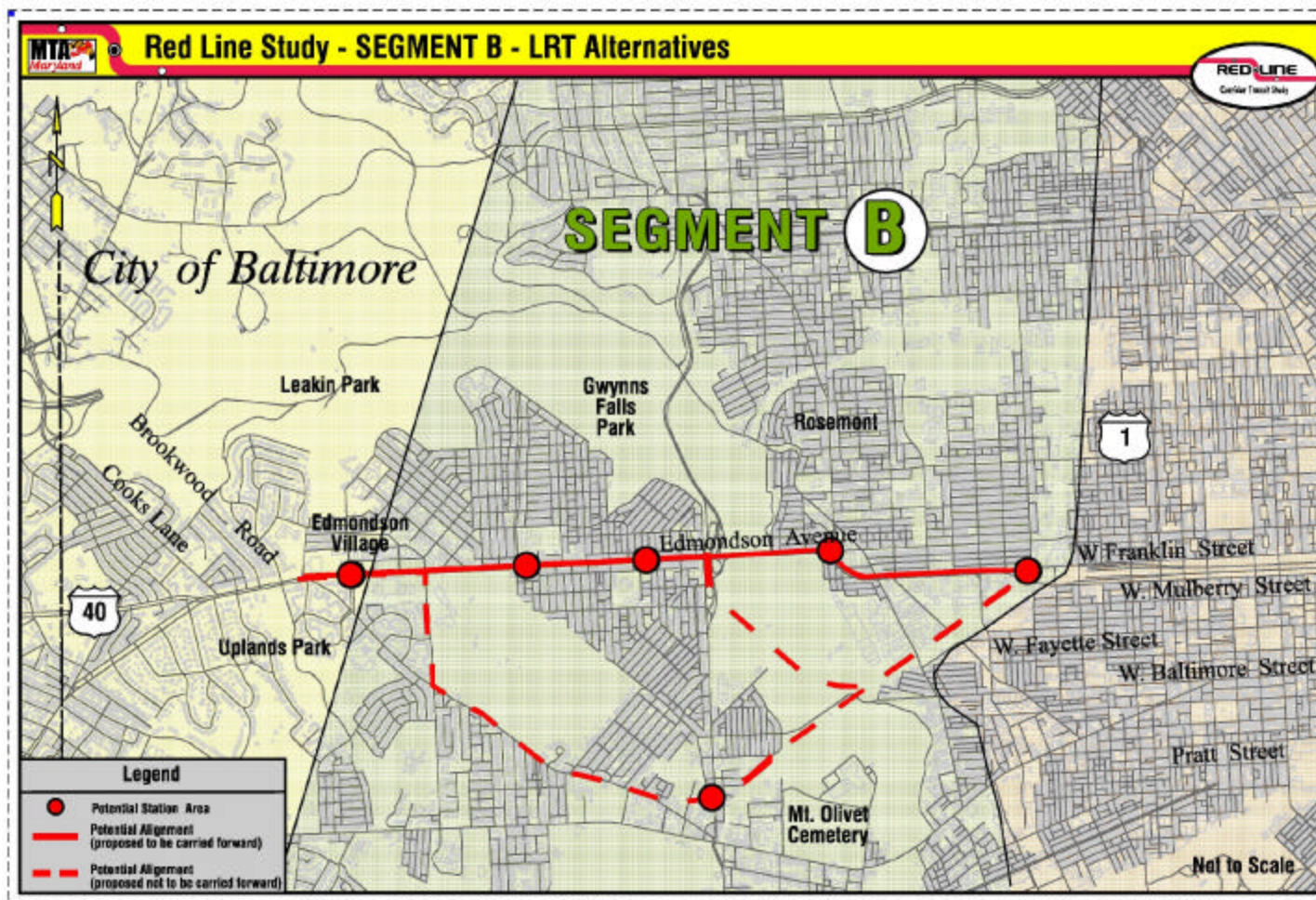


Figure 16: Edmondson Avenue at Swann Avenue to West Baltimore MARC Station LRT Alternatives Recommended for Further Study

OTHER OPTIONS FOR FURTHER STUDY

The following options were not evaluated in detail but are recommended for further study.

Edmondson Avenue – from Swann Avenue to West Baltimore MARC Station

A tunnel alignment along this section is an option to the surface alignment evaluated as part of the Edmondson Avenue/West Franklin Street Alternative.

West Franklin Street – from Walnut and Edmondson Avenues to West Baltimore MARC Station

This is an option to the Edmondson Avenue/West Franklin Street Alternative and will be studied further as a tunnel alignment.

North Franklinton Road -- from W. Franklin Street to MARC

This is an option that would allow access to a relocated West Baltimore MARC Station from the Edmondson Avenue/West Franklin Street Alternative.

North Calverton Road -- from W. Franklin Street to MARC

This is an option similar to the previous option along North Franklinton Road that would allow access to a relocated West Baltimore MARC Station from the Edmondson Avenue/West Franklin Street Alternative.

Edmondson Avenue – from W. Franklin Street to MARC

This is an option to the surface alternative evaluated detail that instead of following US 40/West Franklin Street would extend east along Edmondson Avenue before turning south to the West Baltimore MARC Station.

**SEGMENT C1: West Baltimore MARC Station to University of Maryland-
Baltimore
BRT Alternatives**

DESCRIPTION OF BRT ALTERNATIVES

The following description summarizes the four BRT alternatives evaluated in the screening of preliminary alternatives for this segment. While variations of the following alternatives have been considered, each of the following was determined to be most representative of the respective alternative within this segment. In further study of the alternatives that are retained, design options will continue to be explored and evaluated as described at the end of this section.

US 40 Alternative

The western terminus of this alternative would begin at the West Baltimore MARC Station and would follow the fully controlled access alignment of US 40 to Martin Luther King Junior (MLK) Boulevard. The alignment would then turn south on MLK Boulevard to Baltimore Street at the University of Maryland-Baltimore.

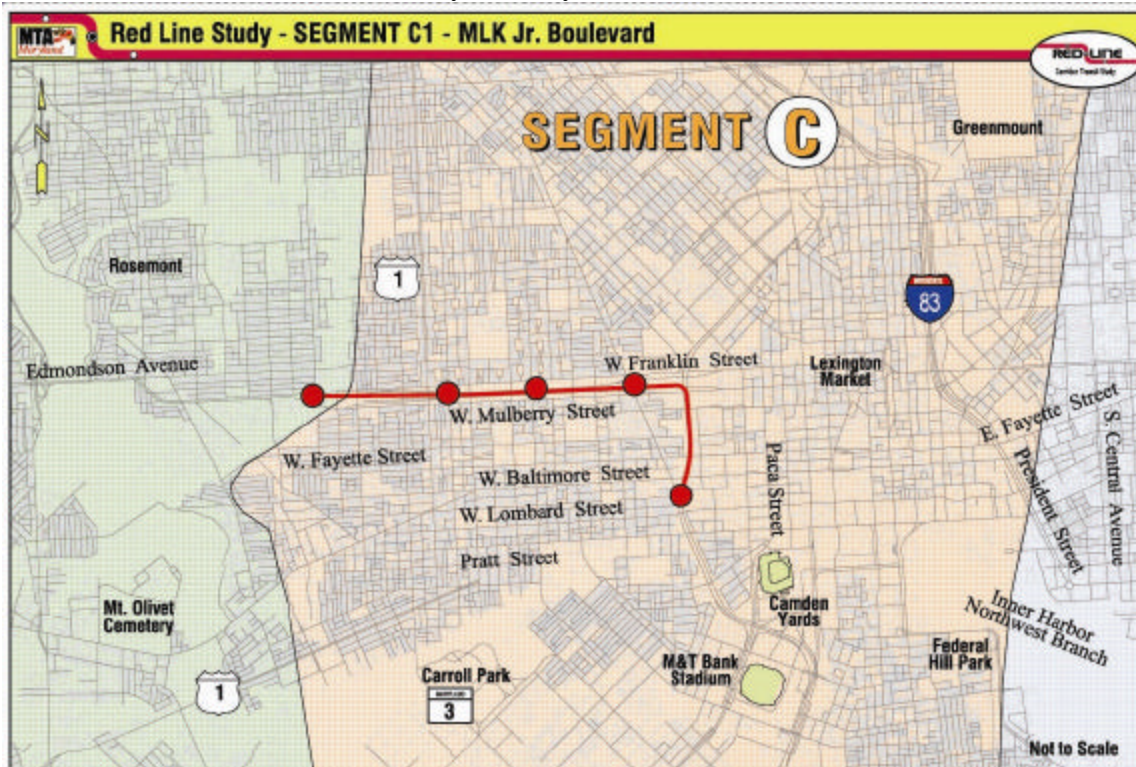


Figure 17: US 40 Alternative from West Baltimore MARC Station to University of Maryland-Baltimore (BRT)

West Franklin Street Alternative

The western terminus of this alternative would begin at the West Baltimore MARC Station following the alignment of West Franklin Street to MLK Boulevard. The alignment would then turn south on MLK Boulevard to Baltimore Street at the University of Maryland-Baltimore.

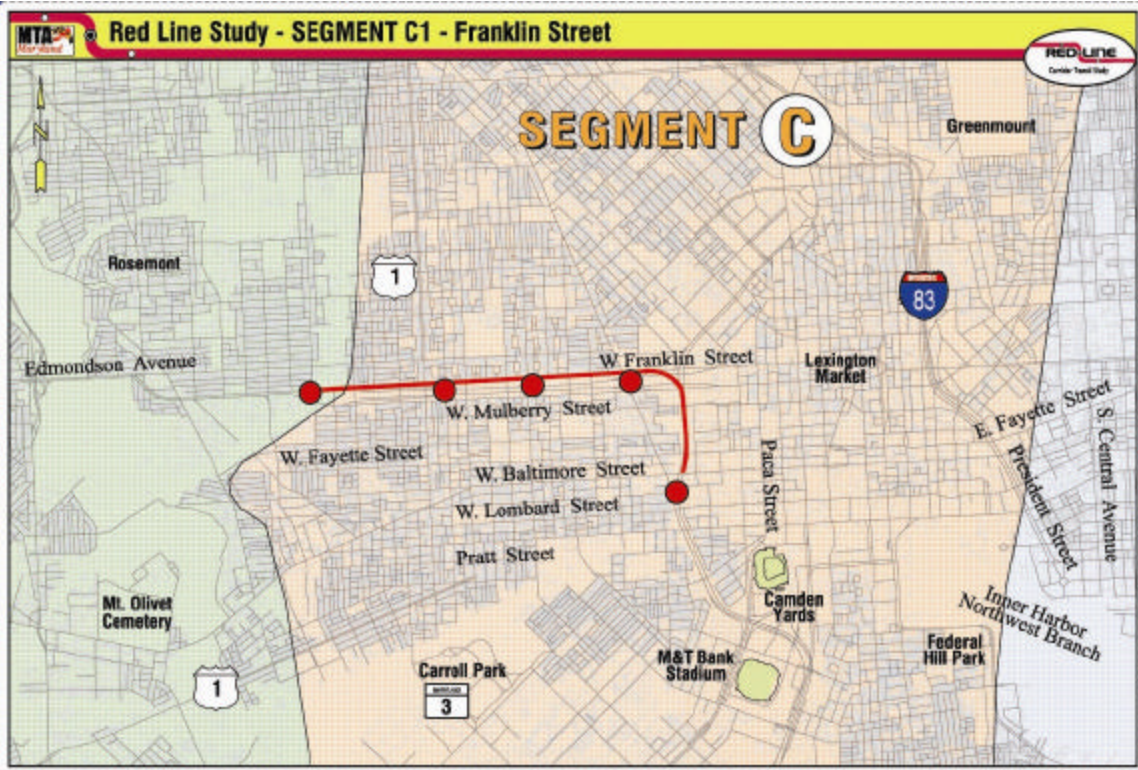


Figure 18: West Franklin Street Alternative from West Baltimore MARC Station to University of Maryland-Baltimore (BRT)

Baltimore/Fayette Alternative

The western terminus of this alternative would begin at a relocated West Baltimore MARC Station. The eastbound and westbound transitway would be separated into one-way pairs. The eastbound transitway would follow West Baltimore Street to the intersection of MLK Boulevard at University of Maryland-Baltimore. The westbound transitway would follow West Fayette Street from MLK Boulevard to the relocated West Baltimore MARC Station.

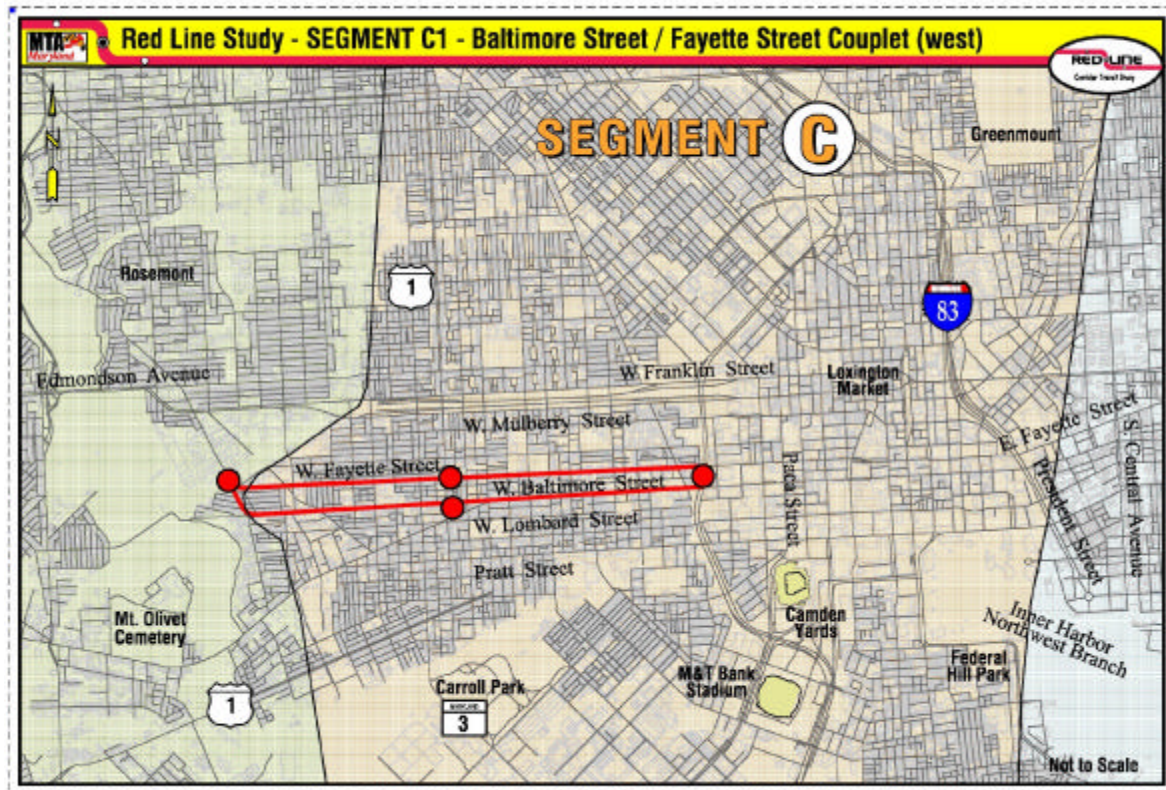


Figure 19: Baltimore/Fayette Alternative from West Baltimore MARC Station to University of Maryland-Baltimore (BRT)

Lombard/Pratt Alternative

The western terminus of this alternative would begin at a relocated West Baltimore MARC Station near Frederick Avenue. The alignment would continue east along Frederick Avenue to the intersection of West Pratt Street. At this point, the eastbound and westbound transitway would be separated into one-way pairs. The eastbound transitway would follow West Pratt Street to the intersection of MLK Boulevard at University of Maryland-Baltimore. The westbound transitway would follow West Lombard Street from MLK Boulevard to Frederick Avenue at West Pratt Street.

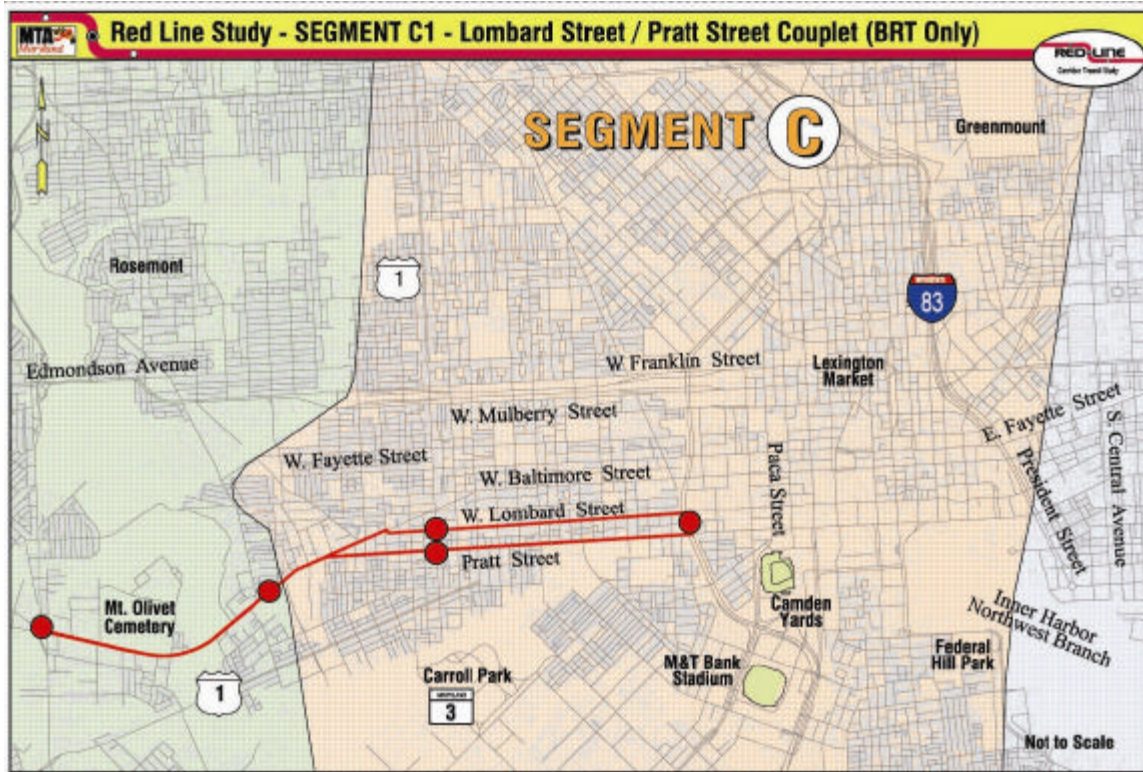


Figure 20: Lombard/Pratt Alternative from West Baltimore MARC Station to University of Maryland-Baltimore (BRT)

EVALUATION OF ALTERNATIVES

Evaluation measures have been selected to reflect the various advantages and disadvantages of each alternative. These evaluation measures are being used for screening all preliminary alternatives for the entire Red Line corridor. The measures are also consistent with criteria prescribed in the FTA Project Justification Rating and Evaluation categories (*i.e.*, New Starts) as well as the Red Line Corridor project goals stated in the Purpose and Need. Definitions for the measures are included in the Appendix.

The following table summarizes the data for the BRT alternatives described above. Those measures that have been determined to have appreciable benefits when compared with other alternatives are shaded.

Table 9: Screening of Preliminary Alternatives, West Baltimore MARC Station to University of Maryland-Baltimore (BRT)

(Note: Shaded cells indicate measure with appreciable benefit.)

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives			
					US 40	W. Franklin	Baltimore/ Fayette	Lombard/ Pratt
					<i>1.6 miles</i>	<i>1.7 miles</i>	<i>1.8 miles</i>	<i>2.5 miles</i>
Cost Effectiveness			Engineering Issues	Meets Design Criteria – <i>Yes or description of how criteria not met</i>	Yes	Yes	Yes	Yes
			Capital Costs	Preliminary Estimate - <i>millions</i>	\$22-\$28	\$28-\$35	\$40-\$50	\$68-\$85
Support Community Revitalization and Economic Development	Impacts and Equity	Transit- Supportive Land Use	Population Served	2000 Population within ¼-mile of Alignment	28,877	30,756	28,361	34,702
				2025 Population within ¼-mile of Alignment	32,195	34,290	30,934	37,048
			Access to Transit	% of Minority Population within ¼-mile of Alignment	85.6%	86.5%	75.7%	64.3%
				% of Low-Income Population within ¼-mile of Alignment	36.7%	35.7%	32.1%	32.4%
			Employment Served	2000 People Living within ¼-mile of Alignment Who Are Employed	8,511	9,141	9,088	11,187
				2025 People Living within ¼-mile of Alignment Who Are Employed	9,489	10,191	9,912	11,943
				2000 Jobs within ¼-mile of Alignment	18,718	18,742	18,801	17,907
			Neighborhood Structure	Activity Centers within ¼-mile of Alignment (Neighborhood Shopping Center (and larger), Entertainment District/Tourist Attractions, and Institutions (schools, hospitals, etc.))	19	22	24	18
				Significant Barrier to Walkability/Access - <i>Yes/No</i>	Yes	Yes	No	No
				Potential for Stations (<i>i.e.</i> , Quantity and Quality of Access) - <i>Low/Medium/High</i>	Medium	High	High	Medium
				Housing Density within a ¼-mile of Alignment – <i>Average # of Dwelling Units per Acre</i>	15.1	15.2	13.5	13.6

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives			
					US 40	W. Franklin	Baltimore/ Fayette	Lombard/ Pratt
					1.6 miles	1.7 miles	1.8 miles	2.5 miles
Support Community Revitalization and Economic Development	Impacts and Equity	Transit- Supportive Land Use	Development Opportunity	Presence of Empowerment Zones/Enterprise Zones/SNAPs/Revitalization Districts within a ¼ mile of Alignment – <i>Yes/No</i>	Yes	Yes	Yes	Yes
				Potential for Development within a ¼-mile of Alignment – <i>Low/Medium/High</i>	High	High	High	High
				Approved development - <i>Square footage or number of units of new office and retail, number of new residential units within ¼-mile of alignment</i>	Bon Secours & OROSW: Shipley Hill (25 ac residential); UMBA Biotech Park (480,000 SF office); UMBA Dental School (367,000 SF high rise); UMBA Student Dorms (337 bed High Rise)			
				Center Point (372 apt. units)		-		
			Transit-Oriented Development (TOD) Opportunity	Potential Sites for TOD and Renaissance Opportunities	1	2	1	1
Environmental Stewardship		Environmental Benefits	Cultural Resources	Historic Districts within Area of Potential Effect (APE) (w/ elevated sensitivity)	9 (3)	9 (3)	6 (1)	7 (3)
				Individual Historic Properties within APE (w/ elevated sensitivity)	5 (1)	5 (1)	5 (3)	11 (6)
				Known Archeological Resources within APE	3	3	10	2
			Parklands	Number of Potentially Impacted Urban Lots	11- proximity	8- edge	0	0
				Number of Potentially Impacted Passive Parks	1-proximity	0	1- edge	3- edge
				Number of Potentially Impacted Play Lots	0	0	2- edge and 3- proximity	1- edge
				Number of Potentially Impacted Regional Parks	0	0	0	0
				Number of Potentially Impacted Open Spaces	0	0	0	0
			Noise	Potential for Impact to Receptors along Alignment (houses, churches, hospitals, parks, etc.) – <i>Low/Medium/High</i>	Low	Low	Low	Medium
			Wetlands	Type (Potential for Impacts)	none	none	none	none
			Streams	Crossings	0	0	0	1

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives			
					US 40	W. Franklin	Baltimore/ Fayette	Lombard/ Pratt
					1.6 miles	1.7 miles	1.8 miles	2.5 miles
Environmental Stewardship	Impacts and Equity	Environmental Benefits	Forests	Crossing(s) - <i>Linear Feet</i>	0	0	0	0
			100-Year Floodplains	Crossing(s) - <i>Linear Feet</i>	0	0	0	300
			Hazardous Material Sites	Potential Sites (Potential Risk)	1 (Moderate) 0 (Severe)	1 (Moderate) 0 (Severe)	2 (Moderate) 0 (Severe)	2 (Moderate) 0 (Severe)
			Rare, Threatened & Endangered Species Habitat	Area of Potential Habitat – <i>Acres</i>	0	0	0	0
Improve Transit System Connectivity	Effectiveness	Mobility and Operating Efficiencies	Intermodal Connections	Connection to Existing MARC – <i>Yes/No/Not Applicable (N/A)/</i> Quality of Connection – <i>High/Med/Low</i>	Yes/High	Yes/High	Yes/High (w/ station relocation)	Yes/High (w/ station relocation)
				Connection to Existing Metro – <i>Yes/No/Not Applicable (N/A)</i>	N/A	N/A	N/A	N/A
				Connection to Existing Light Rail – <i>Yes/No/Not Applicable (N/A)</i>	N/A	N/A	N/A	N/A
				Existing Bus Routes along Alignment	2	2	3	2
				Buses on Bus Routes along Alignment- <i># per day</i>	323	323	345	224
				Existing Bus Routes Intersected	2	2	1	1
				Buses on Intersecting Bus Routes - <i># per day</i>	262	262	108	108
				Estimated Transit Travel Time - <i>minutes</i>	6.3	10.5	10.4	12.8
				Potential Location along the Alignment for a Major Park & Ride – <i>Yes/No</i>	Yes	Yes	Yes	Yes
				Existing Pedestrian Level of Service (LOS) along Alignment	N/A	B	N/A	A-C
				Existing Bicycle LOS along Alignment	N/A	D	N/A	D-E
				Access to Existing/Planned Bicycle Trails along Alignment – <i>Yes/No</i>	No	No	No	No

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives			
					US 40	W. Franklin	Baltimore/ Fayette	Lombard/ Pratt
					1.6 miles	1.7 miles	1.8 miles	2.5 miles
Improve Mobility, Efficiency and Accessibility	Effectiveness	Mobility and Operating Efficiencies	Transit Dependency	2000 Zero-Car Households within ¼-mile of Alignment	7,024	7,276	5,533	6,807
				2000 Households within ¼-mile of Alignment	15,398	16,226	13,493	16,617
				2000 Senior Citizens within ¼- mile of Alignment	3,617	3,922	3,060	3,660
				2000 School-Aged Children within ¼-mile of Alignment	3,452	3,700	3,527	4,110
			Traffic Characteristics	Intersections (signalized and unsignalized) along Alignment	9	28	58	67
				Signalized Intersections along Alignment	7	15	13	22
				Major Intersections along Alignment	6	8	2	7
				Average Daily Traffic along Alignment – <i>Vehicles per day</i>	40,000/ 60,000	9,000/60,000	5,000/4,000	4,000/ 10,000/ 10,000
				Travel Lanes in Peak Direction	2-3	2-3	1-2	1-3
				Existing Minimum Curb-to-Curb Width along Alignment – <i>Feet</i>	110	36	38	35
				Existing Minimum Right-of-Way Width along Alignment – <i>Feet</i>	168	56	64	62
				On-Street Parking – <i>Yes or No, length of parking eastbound (EB), length of parking westbound (WB)</i>	No	No	Yes EB = 3.2 mi. WB = 3.2 mi.	Yes EB = 3.5 mi. WB = 3.2 mi.



Evaluation Measure with Benefit

The following table highlights the evaluation measures only for which it was determined there was appreciable difference among alternatives. For these measures, the shaded cells indicate those with appreciable benefit compared with the other alternatives.

Table 10: Summary of Evaluation Criteria and Measures with Appreciable Benefit, West Baltimore MARC Station to University of Maryland-Baltimore (BRT)

Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives			
		US 40	W. Franklin	Baltimore/ Fayette	Lombard/ Pratt
		<i>1.6 miles</i>	<i>1.7 miles</i>	<i>1.8 miles</i>	<i>2.5 miles</i>
Capital Costs	Preliminary Estimate - <i>millions</i>	\$22-\$28	\$28-\$35	\$40-\$50	\$68-\$85
Access to Transit	% of Minority Population within ¼-mile of Alignment	85.6%	86.5%	75.7%	64.3%
Employment Served	2000 People Living within ¼-mile of Alignment Who Are Employed	8,511	9,141	9,088	11,187
	2025 People Living within ¼-mile of Alignment Who Are Employed	9,489	10,191	9,912	11,943
Neighborhood Structure	Significant Barrier to Walkability/Access - <i>Yes/No</i>	Yes	Yes	No	No
Development Opportunity	Approved development - <i>Square footage or number of units of new office and retail, number of new residential units within ¼-mile of alignment</i>	Bon Secours & OROSW: Shipley Hill (25 ac residential); UMBA Biotech Park (480,000 SF office); UMBA Dental School (367,000 SF high rise); UMBA Student Dorms (337 bed High Rise)			
		Center Point (372 apt. units)		-	
Cultural Resources	Individual Historic Properties within APE (w/ elevated sensitivity)	5 (1)	5 (1)	5 (3)	11 (6)
	Known Archeological Resources within APE	3	3	10	2
Parklands	Number of Potentially Impacted Urban Lots	11- proximity	8- edge	0	0
	Number of Potentially Impacted Passive Parks	1-proximity	0	1- edge	3- edge
	Number of Potentially Impacted Play Lots	0	0	2- edge 3-proximity	1- edge
Noise	Potential for Impact to Receptors along Alignment (houses, churches, hospitals, parks, etc.) – <i>Low/Medium/High</i>	Low	Low	Low	Medium
100-Year Floodplains	Crossing(s) - <i>Linear Feet</i>	0	0	0	300
Intermodal Connections	Buses on Bus Routes along Alignment- <i># per day</i>	323	323	345	224
	Buses on Intersecting Bus Routes - <i># per day</i>	262	262	108	108
	Estimated Transit Travel Time - <i>minutes</i>	6.3	10.5	10.4	12.8
Transit Dependency	2000 Zero-Car Households within ¼-mile of Alignment	7,024	7,276	5,533	6,807

Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives			
		US 40	W. Franklin	Baltimore/Fayette	Lombard/Pratt
		<i>1.6 miles</i>	<i>1.7 miles</i>	<i>1.8 miles</i>	<i>2.5 miles</i>
Traffic Characteristics	Intersections (signalized and unsignalized) along Alignment	9	28	58	67
	Signalized Intersections along Alignment	7	15	13	22
	Major Intersections along Alignment	6	8	2	7
	Average Daily Traffic along Alignment – <i>Vehicles per day</i>	40,000/60,000	9,000/60,000	5,000/4,000	4,000/10,000/10,000
	Existing Minimum Curb-to-Curb Width along Alignment – <i>Feet</i>	110	36	38	35
	Existing Minimum Right-of-Way Width along Alignment – <i>Feet</i>	168	56	64	62
	On-Street Parking – <i>Yes or No, length of parking eastbound (EB), length of parking westbound (WB)</i>	No	No	Yes EB = 3.2 mi. WB = 3.2 mi.	Yes EB = 3.5 mi. WB = 3.2 mi.



Evaluation Measure with Benefit

For each of the evaluation criteria listed above, the following conclusions can be made in the comparison of alternatives:

Capital Costs

- The US 40 and West Franklin Street Alternatives are estimated to have from \$25-\$75 million less in capital cost than either of the other alternatives.

Access to Transit

Percent of Minority Population within 1/4-mile of Alignment

- A higher proportion of the minority population resides near the US 40 and West Franklin Street Alternatives than near either of the other alternatives.

Employment Served

2000 and 2025 People Living within 1/4-mile of Alignment Who Are Employed

- Approximately 2,000 more people in 2000 and 2025 who are employed reside and are projected to reside near the Lombard/Pratt Alternative.

Neighborhood Structure

Significant Barrier to Walkability and Access

- For the US 40 Alternative, the alignment being located below the level of adjacent land use presents an inconvenience to walkability and access. For both the US 40 and West Franklin Alternatives, a portion of the alignment would be along MLK Boulevard which also presents a barrier to walkability. In contrast, Baltimore, Fayette, Lombard nor Pratt Street poses such a barrier for the respective other alternatives.

Development Opportunity

Approved Development

- With the 372-unit Center Point apartment complex, more approved development is within a ¼-mile of the alignment of the US 40 and West Franklin Alternatives.

Cultural Resources

Individual Historic Properties within the Area of Potential Effect (APE)

- There are twice as many individual historic properties within the Area of Potential Effect (within approximately 500 feet of the alignment) for the Lombard/Pratt Alternative.

Known Archeological Resources within the Area of Potential Effect (APE)

- There are at least three times as many known archeological resources within the APE (within approximately 100 feet of the alignment) for the Baltimore/Fayette Alternative.

Parklands

Number of Potentially Impacted Urban Lots

- There would be no urban lots potentially impacted by either the Baltimore/Fayette or Lombard/Pratt Alternatives.

Number of Potentially Impacted Passive Parks

- There would be fewer or no passive parks potentially impacted by the US 40 and West Franklin Street Alternatives.

Number of Potentially Impacted Play Lots

- There would be no play lots potentially impacted by the US 40 and West Franklin Street Alternatives.

Noise

Potential for Impact to Receptors

- Because of proximity to receptors, the Lombard/Pratt Alternative would have a medium potential for noise impact. The potential would be low for the other alternatives because receptors are, in general, further from the alignments.

100-Year Floodplains

Crossings

- The Lombard/Pratt Alternative would cross the 100-year floodplain associated with Gwynns Falls east of the MARC station. However the other alternatives

would also need to cross the Gwynns Falls in Segment B, thereby not causing this item to be a major differentiator.

Intermodal Connections

Buses on Bus Routes along Alignment

- There are approximately 100 fewer buses on bus routes along the alignment of the Lombard/Pratt Alternative.

Buses on Intersecting Bus Routes

- There approximately 150 fewer buses on intersecting bus routes for the Baltimore/Fayette and Lombard/Pratt Alternatives.

Estimated Transit Travel Time

- The US 40 Alternative would have an estimated transit travel time of more than four minutes faster than any of the other alternatives.

Transit Dependency

2000 Zero-Car Households within 1/4-mile of Alignment

- Approximately 1,000-1,700 more households with no automobile reside near the US 40, West Franklin Street and Lombard/Pratt Alternatives.

Traffic Characteristics

Intersections along Alignment

- The US 40 and West Franklin Street Alternatives would encounter 30-56 fewer at-grade intersections than would the other alternatives.

Signalized Intersections along Alignment

- The US 40 Alternative would encounter six to fifteen fewer signalized intersections than would other alternatives.

Major Intersections along Alignment

- The Baltimore/Fayette Alternative would encounter four to six fewer major intersections than would other alternatives.

Average Daily Traffic along Alignment

- Baltimore, Fayette, Lombard, and Pratt Streets currently have only a small fraction of the daily traffic that US 40 and MLK Boulevard carry thereby reducing the potential for conflict between existing traffic flow and the transitway.

Existing Minimum Curb-to-Curb and Right-of-Way Width

- US 40 has much wider roadway and right-of-way. This offers more opportunity to construct a transitway within the roadway.

On-Street Parking

- There is no on-street parking on US 40, West Franklin Street or MLK Boulevard thus avoiding potential conflicts.

RECOMMENDATION

Based on the above evaluation, it is recommended that the Baltimore/Fayette and Lombard/Pratt BRT Alternatives from the West Baltimore MARC Station to University of Maryland-Baltimore not be carried forward for further study.

The rationale for this recommendation is summarized in the following points:

- 1) Based on the evaluation measures, the US 40 and West Franklin Street Alternatives have more positive attributes when compared to the Baltimore/Fayette and Lombard/Pratt Alternatives. In particular, these alternatives yield:
 - Faster estimated transit travel time (US 40)
 - Lower capital cost
 - Fewer intersections
 - Fewer signalized intersections (US 40)
 - Wider existing roadway and right-of-way (US 40)
 - No on-street parking
 - More approved development nearby.
- 2) Specific reasons to eliminate the Baltimore/Fayette Alternative include:
 - Higher number of intersections
 - Higher capital cost due to the one-way transitway pair
 - More potentially impacted play lots and passive parks
 - On-street parking.
- 3) Specific reasons to eliminate the Lombard/Pratt Alternative include:
 - Longer, more circuitous alignment
 - Highest number of intersections, including signalized intersections
 - Higher construction cost due to the Gwynns Falls crossing and one-way transitway pair
 - More individual historic properties within the Area of Potential Effect
 - More potentially impacted play lots and passive parks
 - Longest estimated transit travel time
 - On-street parking.
- 4) Examination of the advantages unique to the Baltimore/Fayette and Lombard/Pratt Alternatives does not warrant further study of the alternatives because:

- The higher numbers of population who are employed are not by themselves of such high magnitude to justify further study of the Lombard/Pratt Alternative.
- Mitigating or avoiding impact to urban lots for the US 40 and West Franklin Street Alternatives will be accomplished in the next phase of the project.
- Encountering the fewest major intersections along the Baltimore/Fayette Alternative does not offset that there are appreciably more total intersections along the alignment.
- Less existing traffic on Baltimore, Fayette, Lombard and Pratt Streets is more of a result of the narrow roadways and more local traffic function of these streets rather than offering opportunities for less conflict with existing traffic.

The following illustrates the alignment for the alternatives recommended for further study (US 40 and West Franklin Street) in contrast to the alternatives recommended for no further study (Baltimore/Fayette and Lombard/Pratt).

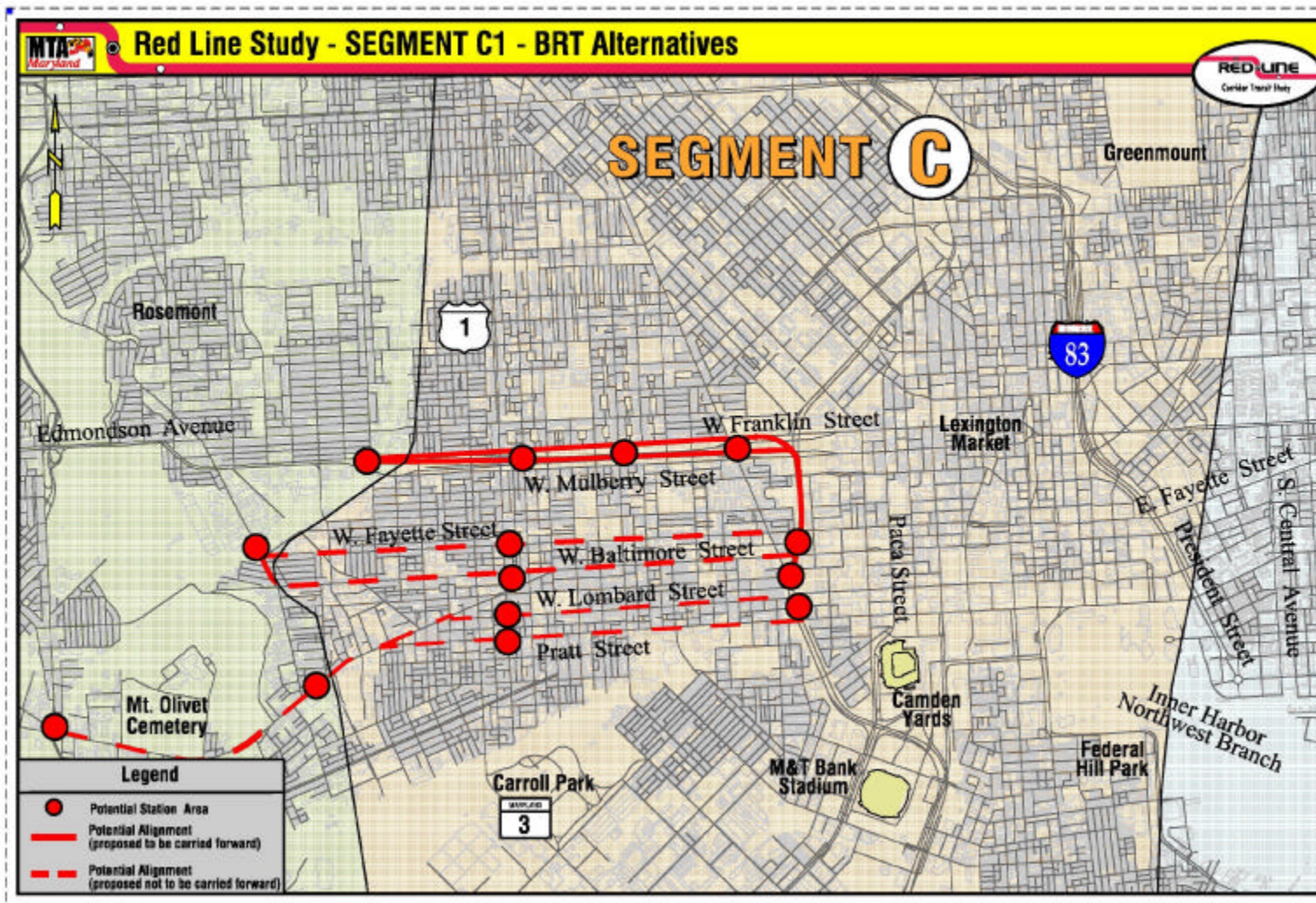


Figure 21: West Baltimore MARC Station to University of Maryland-Baltimore BRT Alternatives Recommended for Further Study

OTHER OPTIONS FOR FURTHER STUDY

The following options were not evaluated in detail but are recommended for further study.

West Mulberry Street

An option for the US 40 or West Franklin Street Alternatives is via West Mulberry Street.

Fremont Avenue

An option for MLK Boulevard is via Fremont Avenue.

**SEGMENT C1: West Baltimore MARC Station to University of Maryland-
Baltimore
LRT Alternatives**

DESCRIPTION OF LRT ALTERNATIVES

The following description summarizes the three LRT alternatives evaluated in the screening of preliminary alternatives for this segment. While variations of the following alternatives have been considered, each of the following was determined to be most representative of the respective alternative within this segment. In further study of the alternatives that are retained, design options will continue to be explored and evaluated as described at the end of this section.

US 40 Alternative

The western terminus of this alternative would begin at the West Baltimore MARC Station and would follow the fully controlled access alignment of US 40 to Martin Luther King Junior (MLK) Boulevard. The alignment would then turn south on MLK Boulevard to Baltimore Street at the University of Maryland-Baltimore.

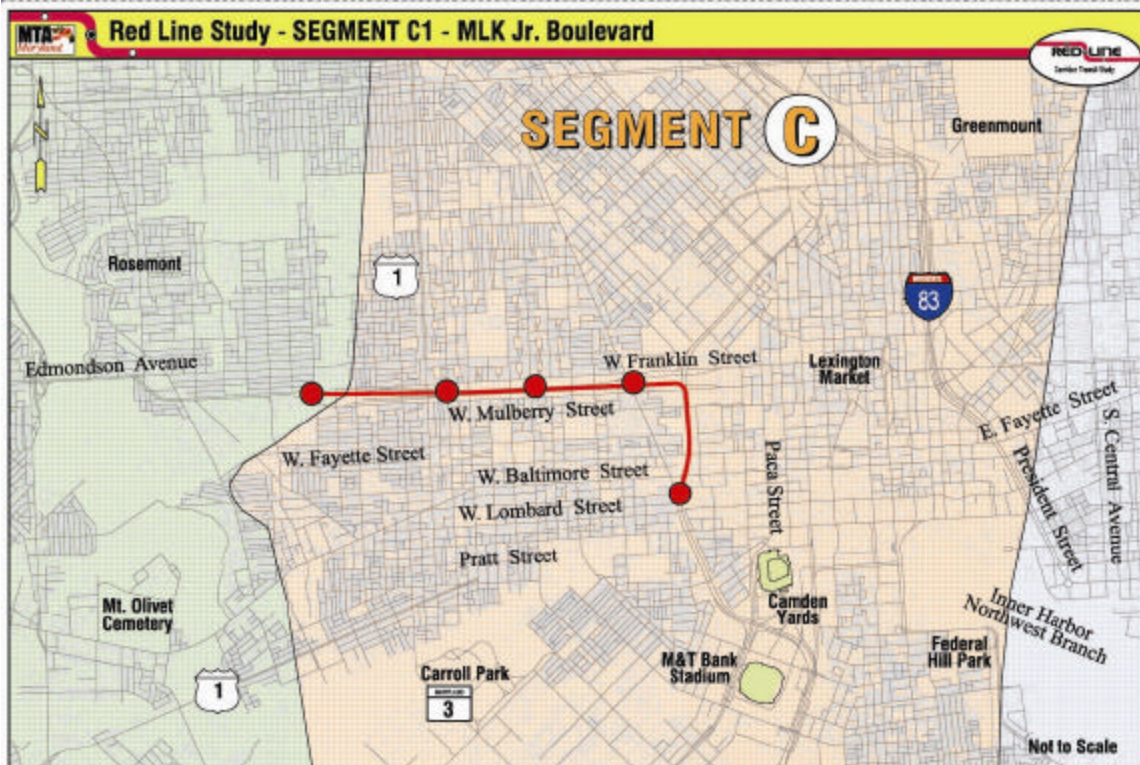


Figure 22: US 40 Alternative from West Baltimore MARC Station to University of Maryland-Baltimore (LRT)

West Franklin Street Alternative

The western terminus of this alternative would begin at the West Baltimore MARC Station following the alignment of West Franklin Street to MLK Boulevard. The alignment would then turn south on MLK Boulevard to Baltimore Street at the University of Maryland-Baltimore.

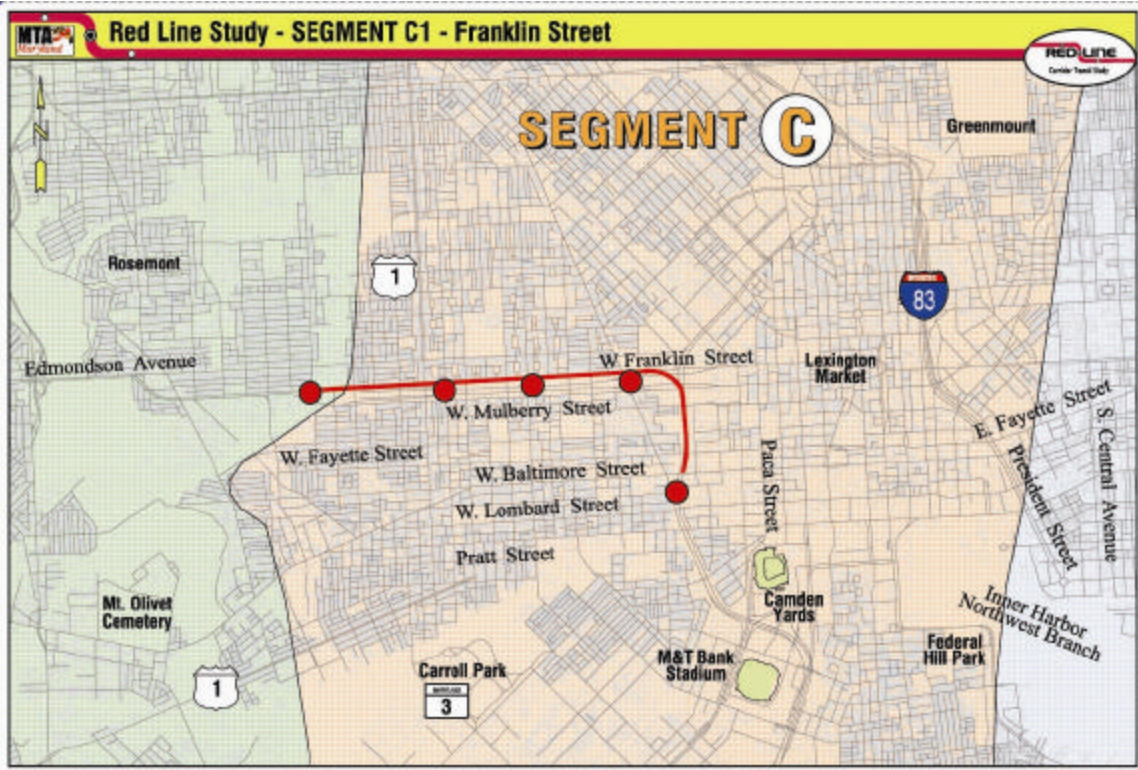


Figure 23: West Franklin Street Alternative from West Baltimore MARC Station to University of Maryland-Baltimore (LRT)

Baltimore/Fayette Alternative

The western terminus of this alternative would begin at a relocated West Baltimore MARC Station. The eastbound and westbound transitway would be separated into one-way pairs. The eastbound transitway would follow West Baltimore Street to the intersection of MLK Boulevard at University of Maryland-Baltimore. The westbound transitway would follow West Fayette Street from MLK Boulevard to the relocated West Baltimore MARC Station.

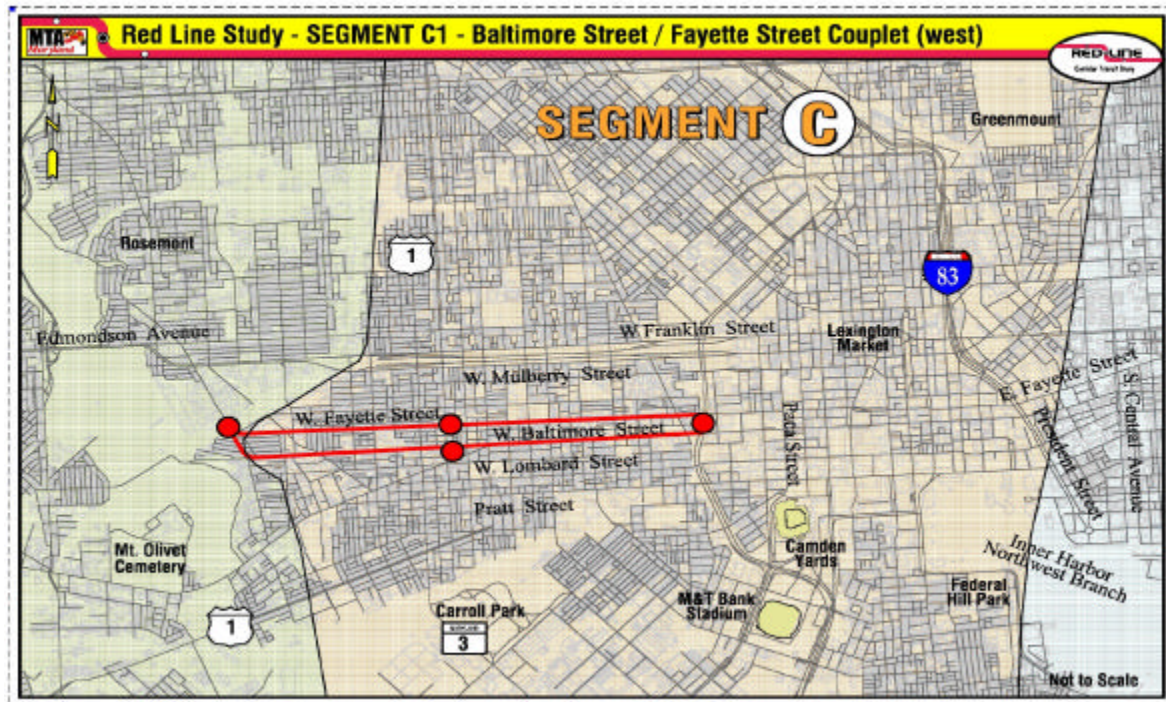


Figure 24: Baltimore/Fayette Alternative from West Baltimore MARC Station to University of Maryland-Baltimore (LRT)

EVALUATION OF ALTERNATIVES

Evaluation measures have been selected to reflect the various advantages and disadvantages of each alternative. These evaluation measures are being used for screening all preliminary alternatives for the entire Red Line corridor. The measures are also consistent with criteria prescribed in the FTA Project Justification Rating and Evaluation categories (*i.e.*, New Starts) as well as the Red Line Corridor project goals stated in the Purpose and Need. Definitions for the measures are included in the Appendix.

The following table summarizes the data for the LRT alternatives described above. Those measures that have been determined to have appreciable benefits when compared with other alternatives are shaded.

Table 11: Screening of Preliminary Alternatives, West Baltimore MARC Station to University of Maryland-Baltimore (LRT)

(Note: Shaded cells indicate measure with appreciable benefit.)

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives		
					US 40	W. Franklin	Baltimore/ Fayette
					1.6 miles	1.7 miles	1.8 miles
Cost Effectiveness			Engineering Issues	Meets Design Criteria – Yes or <i>description of how criteria not met</i>	Yes	Some Grades > 5%	Some Grades > 7%
			Capital Costs	Preliminary Estimate - <i>millions</i>	\$45-\$56	\$50-\$63	\$106-\$124
Support Community Revitalization and Economic Development	Impacts and Equity	Transit-Supportive Land Use	Population Served	2000 Population within ¼-mile of Alignment	28,877	30,756	28,361
				2025 Population within ¼-mile of Alignment	32,195	34,290	30,934
			Access to Transit	% of Minority Population within ¼-mile of Alignment	85.6%	86.5%	75.7%
				% of Low-Income Population within ¼-mile of Alignment	36.7%	35.7%	32.1%
			Employment Served	2000 People Living within ¼-mile of Alignment Who Are Employed	8,511	9,141	9,088
				2025 People Living within ¼-mile of Alignment Who Are Employed	9,489	10,191	9,912
				2000 Jobs within ¼-mile of Alignment	18,718	18,742	18,801
			Neighborhood Structure	Activity Centers within ¼-mile of Alignment (Neighborhood Shopping Center (and larger), Entertainment District/Tourist Attractions, and Institutions (schools, hospitals, etc.))	19	22	24
				Significant Barrier to Walkability/Access - Yes/No	Yes	Yes	No
				Potential for Stations (<i>i.e.</i> , Quantity and Quality of Access) - <i>Low/Medium/High</i>	Medium	High	High
				Housing Density within a ¼-mile of Alignment – <i>Average # of Dwelling Units per Acre</i>	15.1	15.2	13.5

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives		
					US 40	W. Franklin	Baltimore/ Fayette
					<i>1.6 miles</i>	<i>1.7 miles</i>	<i>1.8 miles</i>
Support Community Revitalization and Economic Development	Impacts and Equity	Transit-Supportive Land Use	Development Opportunity	Presence of Empowerment Zones/Enterprise Zones/SNAPs/Revitalization Districts within a ¼ mile of Alignment – Yes/No	Yes	Yes	Yes
				Potential for Development within a ¼-mile of Alignment – <i>Low/Medium/High</i>	High	High	High
				Approved development - <i>Square footage or number of units of new office and retail, number of new residential units within ¼-mile of alignment</i>	Bon Secours & OROSW: Shipley Hill (25 ac residential); UMBA Biotech Park (480,000 SF office); UMBA Dental School (367,000 SF high rise); UMBA Student Dorms (337 bed High Rise)		
			Center Point (372 apt. units)		-		
			Transit-Oriented Development (TOD) Opportunity	Potential Sites for TOD and Renaissance Opportunities	1	2	1
Environmental Stewardship		Environmental Benefits	Cultural Resources	Historic Districts within Area of Potential Effect (APE) (w/ elevated sensitivity)	9 (3)	9 (3)	6 (1)
				Individual Historic Properties within APE (w/ elevated sensitivity)	5 (1)	5 (1)	5 (3)
				Known Archeological Resources within APE	3	3	10
			Parklands	Number of Potentially Impacted Urban Lots	11- proximity	8- edge	0
				Number of Potentially Impacted Passive Parks	1-proximity	0	1- edge
				Number of Potentially Impacted Play Lots	0	0	2- edge and 3- proximity
				Number of Potentially Impacted Regional Parks	0	0	0
				Number of Potentially Impacted Open Spaces	0	0	0
	Noise		Potential for Impact to Receptors along Alignment (houses, churches, hospitals, parks, etc.) – <i>Low/Medium/High</i>	Low	Low	Low	
	Wetlands		Type (Potential for Impacts)	none	none	none	
	Streams		Crossings	0	0	0	

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives		
					US 40	W. Franklin	Baltimore/ Fayette
					1.6 miles	1.7 miles	1.8 miles
Environmental Stewardship	Impacts and Equity	Environmental Benefits	Forests	Crossing(s) - <i>Linear Feet</i>	0	0	0
			100-Year Floodplains	Crossing(s) - <i>Linear Feet</i>	0	0	0
			Hazardous Material Sites	Potential Sites (Potential Risk)	1 (Moderate) 0 (Severe)	1 (Moderate) 0 (Severe)	2 (Moderate) 0 (Severe)
			Rare, Threatened & Endangered Species Habitat	Area of Potential Habitat – <i>Acres</i>	0	0	0
Improve Transit System Connectivity	Effectiveness	Mobility and Operating Efficiencies	Intermodal Connections	Connection to Existing MARC – <i>Yes/No/ Quality of Connection – High/Med/Low</i>	Yes/High	Yes/High	Yes/High (w/ station relocation)
				Connection to Existing Metro – <i>Yes/No/Not Applicable (N/A)</i>	N/A	N/A	N/A
				Connection to Existing Light Rail – <i>Yes/No/Not Applicable (N/A)</i>	N/A	N/A	N/A
				Existing Bus Routes along Alignment	2	2	3
				Buses on Bus Routes along Alignment- <i># per day</i>	323	323	345
				Existing Bus Routes Intersected	2	2	1
				Buses on Intersecting Bus Routes - <i># per day</i>	262	262	108
				Estimated Transit Travel Time - <i>minutes</i>	6.3	10.5	10.4
				Potential Location along the Alignment for a Major Park & Ride – <i>Yes/No</i>	Yes	Yes	Yes
				Existing Pedestrian Level of Service (LOS) along Alignment	N/A	B	N/A
				Existing Bicycle LOS along Alignment	N/A	D	N/A
				Access to Existing/Planned Bicycle Trails along Alignment – <i>Yes/No</i>	No	No	No

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives		
					US 40	W. Franklin	Baltimore/ Fayette
					1.6 miles	1.7 miles	1.8 miles
Improve Mobility, Efficiency and Accessibility	Effectiveness	Mobility and Operating Efficiencies	Transit Dependency	2000 Zero-Car Households within ¼-mile of Alignment	7,024	7,276	5,533
				2000 Households within ¼-mile of Alignment	15,398	16,226	13,493
				2000 Senior Citizens within ¼-mile of Alignment	3,617	3,922	3,060
				2000 School-Aged Children within ¼-mile of Alignment	3,452	3,700	3,527
			Traffic Characteristics	Intersections (signalized and unsignalized) along Alignment	9	28	58
				Signalized Intersections along Alignment	7	15	13
				Major Intersections along Alignment	6	8	2
				Average Daily Traffic along Alignment – <i>Vehicles per day</i>	40,000/ 60,000	9,000/60,000	5,000/4,000
				Travel Lanes in Peak Direction	2-3	2-3	1-2
				Existing Minimum Curb-to-Curb Width along Alignment – <i>Feet</i>	110	36	38
				Existing Minimum Right-of-Way Width along Alignment – <i>Feet</i>	168	56	64
				On-Street Parking – <i>Yes or No, length of parking eastbound (EB), length of parking westbound (WB)</i>	No	No	Yes EB = 3.2 mi. WB = 3.2 mi.




Evaluation Measure with Benefit

The following table highlights the evaluation measures only for which it was determined there was appreciable difference among alternatives. For these measures, the shaded cells indicate those with appreciable benefit compared with the other alternatives.

Table 12: Summary of Evaluation Criteria and Measures with Appreciable Benefit, West Baltimore MARC Station to University of Maryland-Baltimore (LRT)

Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives		
		US 40	W. Franklin	Baltimore/Fayette
		<i>1.6 miles</i>	<i>1.7 miles</i>	<i>1.8 miles</i>
Capital Costs	Preliminary Estimate - <i>millions</i>	\$45-\$56	\$50-\$63	\$106-\$124
Access to Transit	% of Minority Population within ¼-mile of Alignment	85.6%	86.5%	75.7%
Neighborhood Structure	Significant Barrier to Walkability/Access - <i>Yes/No</i>	Yes	Yes	No
Development Opportunity	Approved development - <i>Square footage or number of units of new office and retail, number of new residential units within ¼-mile of alignment</i>	Bon Secours & OROSW: Shipley Hill (25 ac residential); UMBA Biotech Park (480,000 SF office); UMBA Dental School (367,000 SF high rise); UMBA Student Dorms (337 bed High Rise)		
		Center Point (372 apt. units)		-
Cultural Resources	Known Archeological Resources within APE	3	3	10
Parklands	Number of Potentially Impacted Urban Lots	11- proximity	8- edge	0
	Number of Potentially Impacted Passive Parks	1-proximity	0	1- edge
	Number of Potentially Impacted Play Lots	0	0	2- edge 3-proximity
Intermodal Connections	Buses on Intersecting Bus Routes - <i># per day</i>	262	262	108
	Estimated Transit Travel Time - <i>minutes</i>	6.3	10.5	10.4
Transit Dependency	2000 Zero-Car Households within ¼-mile of Alignment	7,024	7,276	5,533
Traffic Characteristics	Intersections (signalized and unsignalized) along Alignment	9	28	58
	Signalized Intersections along Alignment	7	15	13
	Major Intersections along Alignment	6	8	2
	Average Daily Traffic along Alignment – <i>Vehicles per day</i>	40,000/ 60,000	9,000/ 60,000	5,000/4,000

Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives		
		US 40	W. Franklin	Baltimore/Fayette
		<i>1.6 miles</i>	<i>1.7 miles</i>	<i>1.8 miles</i>
Traffic Characteristics	Existing Minimum Curb-to-Curb Width along Alignment – <i>Feet</i>	110	36	38
	Existing Minimum Right-of-Way Width along Alignment – <i>Feet</i>	168	56	64
	On-Street Parking – <i>Yes or No, length of parking eastbound (EB), length of parking westbound (WB)</i>	No	No	Yes EB = 3.2 mi. WB = 3.2 mi.

 Evaluation Measure with Benefit

For each of the evaluation criteria listed above, the following conclusions can be made in the comparison of alternatives:

Capital Costs

- The US 40 and West Franklin Street Alternatives are estimated to have from \$60 to \$65 million less in capital cost than either of the other alternatives.

Access to Transit

Percent of Minority Population within ¼-mile of Alignment

- A higher proportion of the minority population resides near the US 40 and West Franklin Street Alternatives than near either of the other alternatives.

Neighborhood Structure

Significant Barrier to Walkability and Access

- For the US 40 Alternative, the alignment being located below the level of adjacent land use presents an inconvenience to walkability and access. For both the US 40 and West Franklin Alternatives, a portion of the alignment would be along MLK Boulevard which also presents a barrier to walkability. In contrast, neither Baltimore nor Fayette Street poses such a barrier for the respective other alternative.

Development Opportunity

Approved Development

- With the 372-unit Center Point apartment complex, more approved development is within a ¼-mile of the alignment of the US 40 and West Franklin Alternatives.

Cultural Resources

Known Archeological Resources within the Area of Potential Effect (APE)

- There are at least three times as many known archeological resources within the APE (within approximately 100 feet of the alignment) for the Baltimore/Fayette Alternative.

Parklands

Number of Potentially Impacted Urban Lots

- There would be no urban lots potentially impacted by the Baltimore/Fayette Alternative.

Number of Potentially Impacted Passive Parks

- There would be fewer or no passive parks potentially impacted by the US 40 and West Franklin Street Alternatives.

Number of Potentially Impacted Play Lots

- There would be no play lots potentially impacted by the US 40 and West Franklin Street Alternatives.

Intermodal Connections

Buses on Intersecting Bus Routes

- There approximately 150 fewer buses on intersecting bus routes for the Baltimore/Fayette Alternative.

Estimated Transit Travel Time

- The US 40 Alternative would have an estimated transit travel time of more than four minutes faster than any of the other alternatives.

Transit Dependency

2000 Zero-Car Households within 1/4-mile of Alignment

- Approximately 1,000-1,700 more households with no automobile reside near the US 40 and West Franklin Street Alternatives.

Traffic Characteristics

Intersections along Alignment

- The US 40 and West Franklin Street Alternatives would encounter 30-50 fewer at-grade intersections than would the Baltimore/Fayette Alternative.

Signalized Intersections along Alignment

- The US 40 Alternative would encounter six to eight fewer signalized intersections than would other alternatives.

Major Intersections along Alignment

- The Baltimore/Fayette Alternative would encounter four to six fewer major intersections than would other alternatives.

Average Daily Traffic along Alignment

- Baltimore and Fayette Streets currently have only a small fraction of the daily traffic that US 40 and MLK Boulevard carry thereby reducing the potential for conflict between existing traffic flow and the transitway.

Existing Minimum Curb-to-Curb and Right-of-Way Width

- US 40 has much wider roadway and right-of-way. This offers more opportunity to construct a transitway within the roadway.

On-Street Parking

- There is no on-street parking on US 40, West Franklin Street or MLK Boulevard thus avoiding potential conflicts.

RECOMMENDATION

Based on the above evaluation, it is recommended that the Baltimore/Fayette LRT Alternative from the West Baltimore MARC Station to University of Maryland-Baltimore not be carried forward for further study.

The rationale for this recommendation is summarized in the following points:

- 1) Based on the evaluation measures, the US 40 and West Franklin Street Alternatives have more positive attributes when compared to the Baltimore/Fayette Alternatives. In particular, these alternatives yield:
 - Faster estimated transit travel time (US 40)
 - Lower capital cost
 - Fewer intersections
 - Fewer signalized intersections (US 40)
 - Wider existing roadway and right-of-way (US 40)
 - No on-street parking
 - More approved development nearby.
- 2) Specific reasons to eliminate the Baltimore/Fayette Alternative include:
 - Highest number of intersections
 - Highest capital cost due to the one-way transitway pair
 - Fewer households nearby without a car
 - More potentially impacted play lots and passive parks
 - More known archeological resources within the Area of Potential Effect
 - On-street parking.
- 3) Examination of the advantages unique to the Baltimore/Fayette Alternative does not warrant further study of the alternative because:
 - Mitigating or avoiding impact to urban lots for the US 40 and West Franklin Street Alternatives will be accomplished in the next phase of the project.
 - Encountering the fewest major intersections along the Baltimore/Fayette Alternative does not offset that there are appreciably more total intersections along the alignment.
 - Less existing traffic on Baltimore and Fayette Streets is more of a result of the narrow roadways and more local traffic function of these streets rather than offering opportunities for less conflict with existing traffic.

The following illustrates the alignment for the alternatives recommended for further study (US 40 and West Franklin Street) in contrast to the alternative recommended for no further study (Baltimore/Fayette).

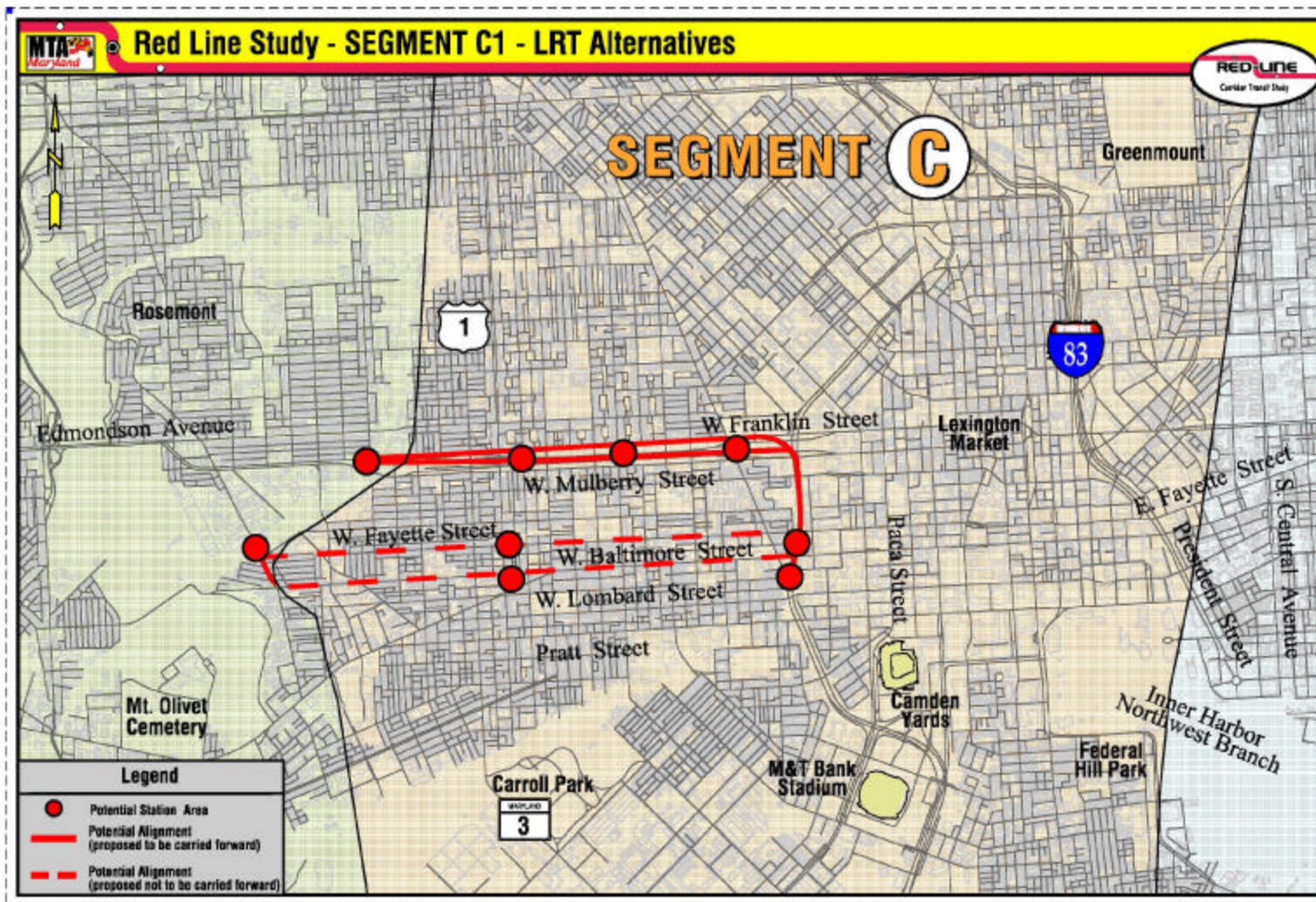


Figure 25: West Baltimore MARC Station to University of Maryland-Baltimore LRT Alternatives Recommended for Further Study

OTHER OPTIONS FOR FURTHER STUDY

The following options were not evaluated in detail but are recommended for further study.

West Mulberry Street

An option for the US 40 or West Franklin Street Alternatives is via West Mulberry Street.

Fremont Avenue

An option for MLK Boulevard is via Fremont Avenue.

SEGMENT C2: US 40 and Fremont Avenue to Central Avenue and Eastern Avenue
BRT Alternatives

DESCRIPTION OF BRT ALTERNATIVES

The following description summarizes the four BRT alternatives evaluated in the screening of preliminary alternatives for this segment. While variations of the following alternatives have been considered, each of the following was determined to be most representative of the respective alternative within this segment. In further study of the alternatives that are retained, design options will continue to be explored and evaluated as described at the end of this section.

Saratoga Street Alternative

The western terminus of this alternative would begin where the fully controlled access alignment of US 40 ends near Fremont Avenue. From this point the alignment would continue southeast to Saratoga Street at-grade and would follow Saratoga Street to the intersection with Saint Paul Street. The alignment would turn south and continue on Saint Paul Street to East Baltimore Street and East Fayette Street. At East Fayette Street, the transitway would be separated into one-way pairs. The eastbound transitway would follow Saint Paul Street to East Baltimore Street to its intersection with South Central Avenue. The westbound transitway would follow East Fayette Street from South Central Avenue to Saint Paul Street. At South Central Avenue, the transitway would resume two-way operation south along Central Avenue to the intersection of Eastern Avenue.

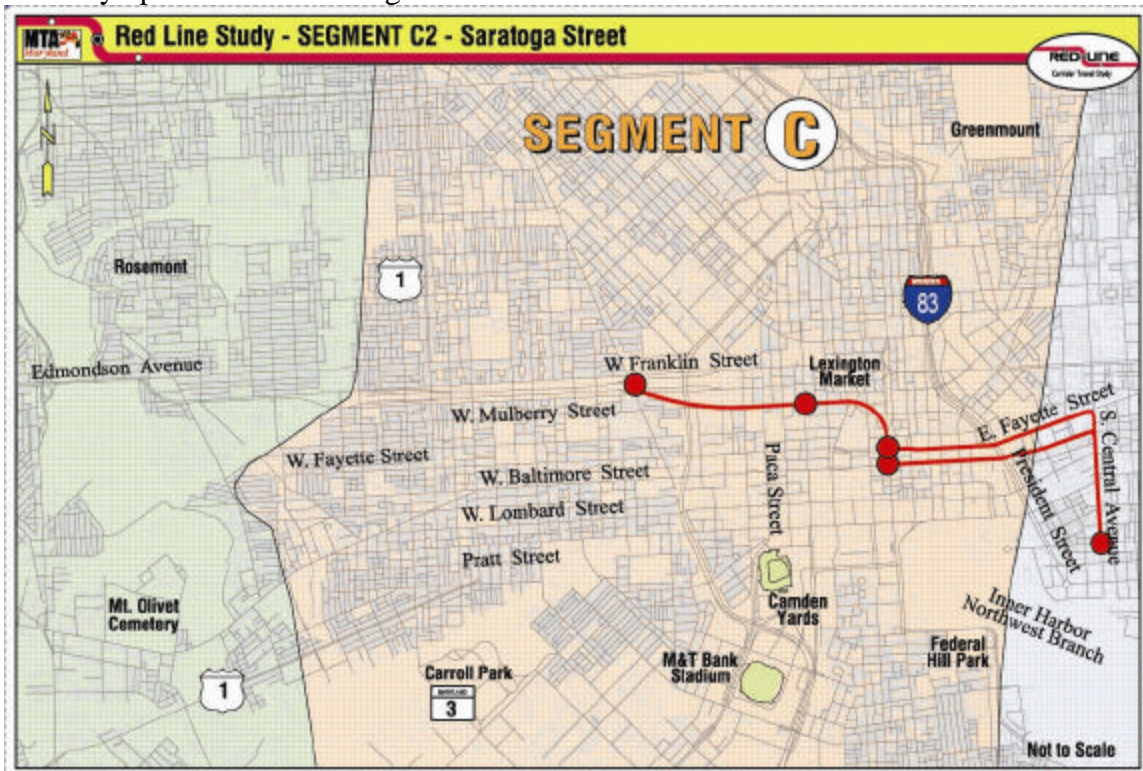


Figure 26: Saratoga Street Alternative from US 40 and Fremont Avenue to Central Avenue and Eastern Avenue (BRT)

Baltimore/Fayette Alternative

The western terminus of this alternative would begin where the fully controlled access alignment of US 40 ends near Fremont Avenue. From this point the alignment would continue east to Martin Luther King Junior (MLK) Boulevard and would turn south and follow MLK Boulevard to West Fayette Street. At West Fayette Street, the transitway would be separated into one-way pairs. The eastbound transitway would follow MLK Boulevard to Baltimore Street to its intersection with South Central Avenue. The westbound transitway would follow Fayette Street from South Central Avenue to MLK Boulevard. At South Central Avenue, the transitway would resume two-way operation south along Central Avenue to the intersection of Eastern Avenue.

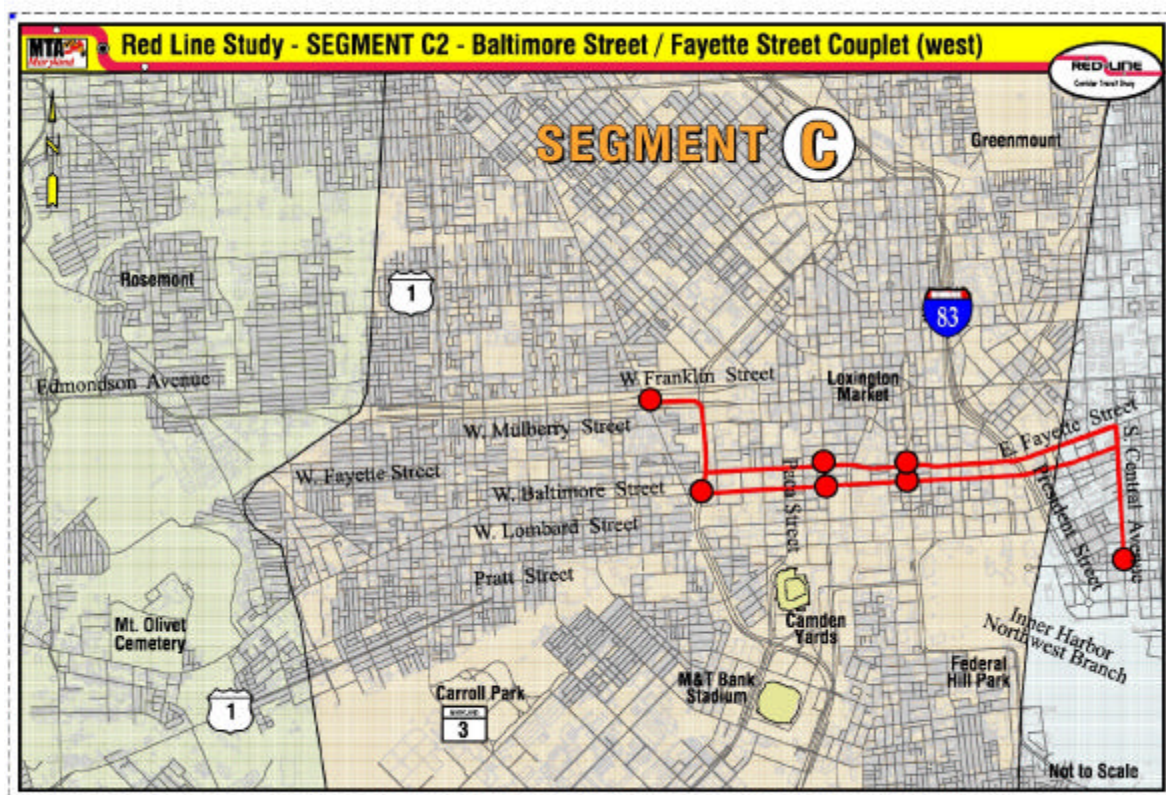


Figure 27: Baltimore/Fayette Alternative from US 40 and Fremont Avenue to Central Avenue and Eastern Avenue (BRT)

Baltimore/Lombard Alternative

The western terminus of this alternative would begin where the fully controlled access alignment of US 40 ends near Fremont Avenue. From this point the alignment would continue southeast to MLK Boulevard and would turn south and follow MLK Boulevard to West Baltimore Street. At West Baltimore Street, the transitway would be separated into one-way pairs. The eastbound transitway would follow Baltimore Street to its intersection with South Central Avenue. The westbound transitway would follow Lombard Street from South Central Avenue to MLK Boulevard. At South Central Avenue, the transitway would resume two-way operation south along Central Avenue to the intersection of Eastern Avenue.

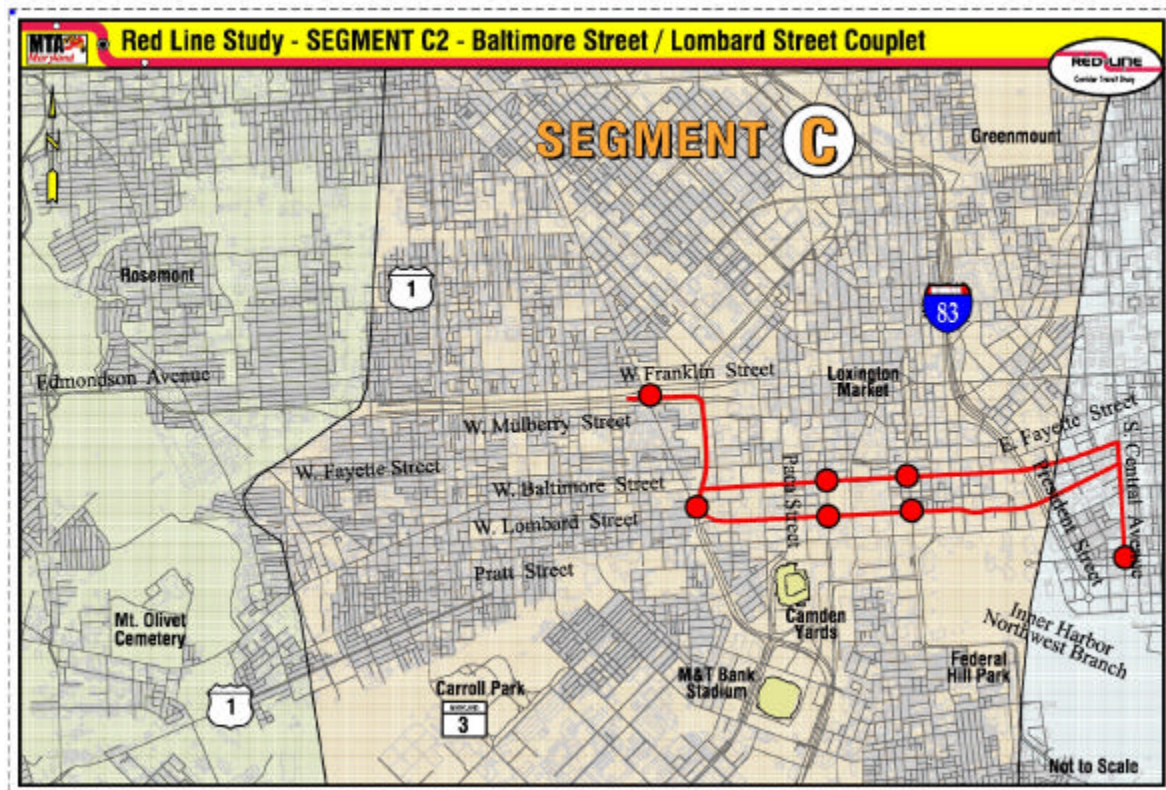


Figure 28: Baltimore/Lombard Alternative from US 40 and Fremont Avenue to Central Avenue and Eastern Avenue (BRT)

Lombard/Pratt Alternative

The western terminus of this alternative would begin where the fully controlled access alignment of US 40 ends near Fremont Avenue. From this point the alignment would continue southeast to MLK Boulevard and would turn south and follow MLK Boulevard to West Lombard Street. At West Lombard Street, the transitway would be separated into one-way pairs. The eastbound transitway would follow MLK Boulevard to Pratt Street to its intersection with South Central Avenue. The westbound transitway would follow Lombard Street from South Central Avenue to MLK Boulevard. At South Central Avenue, the transitway would resume two-way operation south along Central Avenue to the intersection of Eastern Avenue.

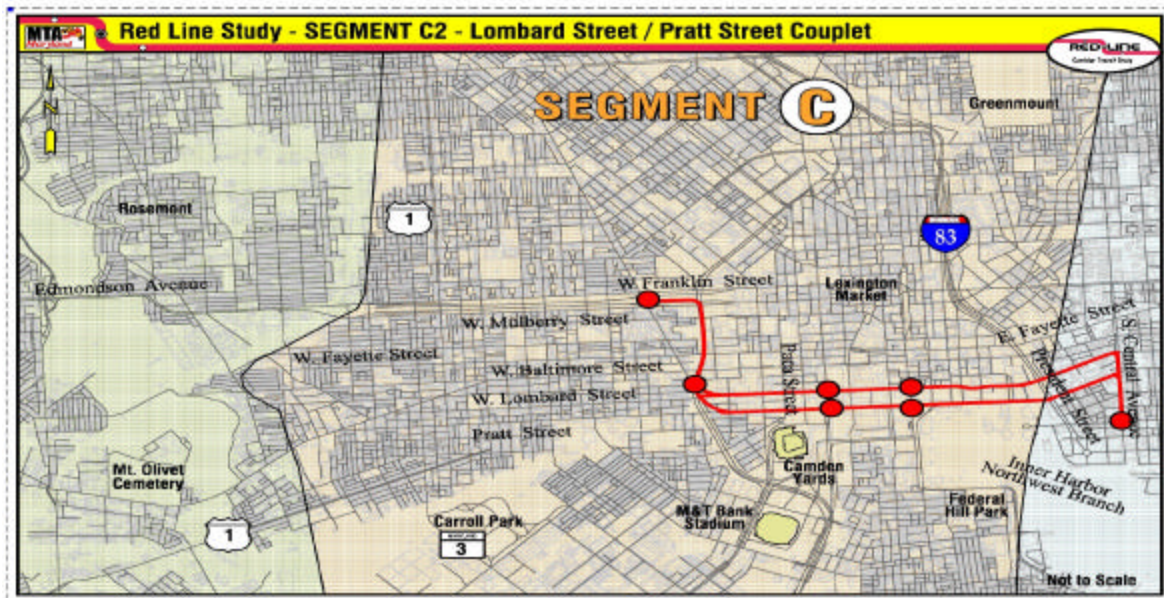


Figure 29: Lombard/Pratt Alternative from US 40 and Fremont Avenue to Central Avenue and Eastern Avenue (BRT)

EVALUATION OF ALTERNATIVES

Evaluation measures have been selected to reflect the various advantages and disadvantages of each alternative. These evaluation measures are being used for screening all preliminary alternatives for the entire Red Line corridor. The measures are also consistent with criteria prescribed in the FTA Project Justification Rating and Evaluation categories (*i.e.*, New Starts) as well as the Red Line Corridor project goals stated in the Purpose and Need. Definitions for the measures are included in the Appendix.

The following table summarizes the data for the BRT alternatives described above. Those measures that have been determined to have appreciable benefits when compared with other alternatives are shaded.

Table 13: Screening of Preliminary Alternatives, US 40 and Fremont Avenue to Central Avenue and Eastern Avenue (BRT)

(Note: Shaded cells indicate measure with appreciable benefit.)

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives			
					Saratoga Street	Baltimore/ Fayette	Baltimore/ Lombard	Lombard/ Pratt
					<i>2.5 miles</i>	<i>2.5 miles</i>	<i>2.6 miles</i>	<i>2.6 miles</i>
Cost Effectiveness			Engineering Issues	Meets Design Criteria – <i>Yes or description of how criteria not met</i>	Yes	Yes	Yes	Yes
			Capital Costs	Preliminary Estimate - <i>millions</i>	\$52-\$65	\$56-\$71	\$60-\$75	\$58-\$73
Support Community Revitalization and Economic Development	Impacts and Equity	Transit-Supportive Land Use	Population Served	2000 Population within ¼-mile of Alignment	23,225	25,770	25,770	26,714
				2025 Population within ¼-mile of Alignment	32,777	33,994	33,994	35,015
			Access to Transit	% of Minority Population within ¼-mile of Alignment	67.8%	69.2%	69.2%	69.9%
				% of Low-Income Population within ¼-mile of Alignment	34.6%	38.0%	38.0%	37.8%
			Employment Served	2000 People Living within ¼-mile of Alignment Who Are Employed	8,600	8,463	8,463	8,798
				2025 People Living within ¼-mile of Alignment Who Are Employed	12,137	11,164	11,164	11,532
				2000 Jobs within ¼-mile of Alignment	85,996	99,645	98,812	90,840
			Neighborhood Structure	Activity Centers within ¼-mile of Alignment (Neighborhood Shopping Center (and larger), Entertainment District/Tourist Attractions, and Institutions (schools, hospitals, etc.))	43	46	48	44
				Significant Barrier to Walkability/Access - <i>Yes/No</i>	No	No	No	No
				Potential for Stations (<i>i.e.</i> , Quantity and Quality of Access) - <i>Low/Medium/High</i>	Medium	High	High	High
				Housing Density within a ¼-mile of Alignment – <i>Average # of Dwelling Units per Acre</i>	11.9	10.6	10.6	11.1

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives			
					Saratoga Street	Baltimore/ Fayette	Baltimore/ Lombard	Lombard/ Pratt
					2.5 miles	2.5 miles	2.6 miles	2.6 miles
Support Community Revitalization and Economic Development	Impacts and Equity	Transit-Supportive Land Use	Development Opportunity	Presence of Empowerment Zones/Enterprise Zones/SNAPs/Revitalization Districts within a ¼ mile of Alignment – Yes/No	Yes	Yes	Yes	Yes
				Potential for Development within a ¼-mile of Alignment – Low/Medium/High	High	High	High	High
				Approved development - Square footage or number of units of new office and retail, number of new residential units within ¼-mile of alignment	Heritage Crossing; UMBA Biotech Park (480,000 SF Office); UMBA Dental School (367,000 SF High Rise); UMBA Student Dorms (337 bed High Rise); Center point (372 apt units); Marriott Residence Inn (125 DU); One Light Street Hotel (289 room hotel); Westin Hotel; Lockwood place; Flaghouse Courts Redevelopment; Bohagers Site/Fells Point (40 condos/325 apts unit); Inner Harbor East			
					-	Market Center; Convention Hotel	Market Center	
			Transit-Oriented Development (TOD) Opportunity	Potential Sites for TOD and Renaissance Opportunities	0	0	0	0
Environmental Stewardship	Impacts and Equity	Environmental Benefits	Cultural Resources	Historic Districts within Area of Potential Effect (APE) (w/ elevated sensitivity)	10 (4)	12 (4)	13 (4)	13 (5)
				Individual Historic Properties within APE (w/ elevated sensitivity)	32 (13)	43 (13)	41 (15)	22 (9)
				Known Archeological Resources within APE	14	14	19	15
			Parklands	Number of Potentially Impacted Urban Lots	4-edge and 1 proximity	6- edge	7-edge and 1 proximity	3-edge and 1 proximity
				Number of Potentially Impacted Passive Parks	4- edge	3- proximity	2- edge	2- edge
				Number of Potentially Impacted Play Lots	1- proximity	1- proximity	1- proximity	1- proximity
				Number of Potentially Impacted Regional Parks	0	0	0	0
				Number of Potentially Impacted Open Spaces	0	0	0	0

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives			
					Saratoga Street	Baltimore/ Fayette	Baltimore/ Lombard	Lombard/ Pratt
					2.5 miles	2.5 miles	2.6 miles	2.6 miles
Environmental Stewardship	Impacts and Equity	Environmental Benefits	Noise	Potential for Impact to Receptors along Alignment (houses, churches, hospitals, parks, etc.) – <i>Low/Medium/High</i>	Low	Low	Low	Low
			Wetlands	Type (Potential for Impacts)	none	none	none	none
			Streams	Crossings	0	0	1	2
			Forests	Crossing(s) - <i>Linear Feet</i>	0	0	0	0
			100-Year Floodplains	Crossing(s) - <i>Linear Feet</i>	900	900	1,500	3,500
			Hazardous Material Sites	Potential Sites (Potential Risk)	9 (Moderate) 0 (Severe)	6 (Moderate) 0 (Severe)	6 (Moderate) 0 (Severe)	6 (Moderate) 0 (Severe)
			Rare, Threatened & Endangered Species Habitat	Area of Potential Habitat – <i>Acres</i>	120	121	122	123
					1,200 ft. radius from source			
Improve Transit System Connectivity	Effectiveness	Mobility and Operating Efficiencies	Intermodal Connections	Connection to Existing MARC – <i>Yes/No/Not Applicable (N/A)/Quality of Connection – High/Med/Low</i>	N/A	Yes/Low	Yes/Low	Yes/Med
				Connection to Existing Metro – <i>Yes/No/ Quality of Connection – High/Med/Low</i>	Yes/High	Yes/Med- High	Yes/Med-High	Yes/Med
				Connection to Existing Light Rail – <i>Yes/No/ Quality of Connection – High/Med/Low</i>	Yes/Med	Yes/High	Yes/High	Yes/High
				Existing Bus Routes along Alignment	3	4	7	3
				Buses on Bus Routes along Alignment- <i># per day</i>	852	1,160	1,771	711
				Existing Bus Routes Intersected	31	30	30	22
				Buses on Intersecting Bus Routes - <i># per day</i>	>2,000	>2,000	>2,000	>2,000
				Estimated Transit Travel Time - <i>minutes</i>	18.4	17.4	18.0	20.3
				Potential Location along the Alignment for a Major Park & Ride – <i>Yes/No</i>	No	No	No	No

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives			
					Saratoga Street	Baltimore/ Fayette	Baltimore/ Lombard	Lombard/ Pratt
					2.5 miles	2.5 miles	2.6 miles	2.6 miles
Improve Transit System Connectivity	Effectiveness	Mobility and Operating Efficiencies	Intermodal Connections	Existing Pedestrian Level of Service (LOS) along Alignment	N/A	A-C	N/A	A-C
				Existing Bicycle LOS along Alignment	N/A	D-E	N/A	D-E
				Access to Existing/Planned Bicycle Trails along Alignment – Yes/No	Yes	Yes	Yes	Yes
Transit Dependency			2000 Zero-Car Households within ¼-mile of Alignment	6,595	6,534	6,534	6,777	
			2000 Households within ¼-mile of Alignment	14,142	14,444	14,444	14,933	
			2000 Senior Citizens within ¼-mile of Alignment	3,295	3,339	3,339	3,461	
			2000 School-Aged Children within ¼-mile of Alignment	1,757	2,377	2,377	2,475	
Traffic Characteristics			Intersections (signalized and unsignalized) along Alignment	54	69	64	67	
			Signalized Intersections along Alignment	30	42	40	46	
			Major Intersections along Alignment	19	26	27	28	
			Average Daily Traffic along Alignment – <i>Vehicles per day</i>	9,000/19,000/1,000-11,000/12,000-22,000/8,000	40,000/60,000/1,000-11,000/12,000-21,000/8,000	40,000/60,000/1,000-11,000-37,000/8,000	40,000/60,000/11,000-37,000/11,000-43,000/8,000	
			Travel Lanes in Peak Direction	1-4	1-3	1-6	1-6	
			Existing Minimum Curb-to-Curb Width along Alignment – <i>Feet</i>	28	36	28	28	
			Existing Minimum Right-of-Way Width along Alignment – <i>Feet</i>	50	58	50	50	
			On-Street Parking – <i>Yes or No, length of parking eastbound (EB), length of parking westbound (WB)</i>	Yes EB = 1.2 miles; WB = 1.0 miles	Yes EB = 1.1 miles; WB = 1.3 miles	Yes EB = 0.4 miles; WB = 1.1 miles	Yes EB = 0.0; WB = 0.5 miles	



Evaluation Measure with Benefit

The following table highlights the evaluation measures only for which it was determined there is appreciable difference among alternatives. For these measures, the shaded cells indicate those with appreciable benefit compared with the other alternatives.

Table 14. Summary of Evaluation Criteria and Measures with Appreciable Benefit, US 40 and Fremont Avenue to Central Avenue and Eastern Avenue (BRT)

Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives			
		Saratoga Street	Baltimore/ Fayette	Baltimore/ Lombard	Lombard/ Pratt
		2.5 miles	2.5 miles	2.6 miles	2.6 miles
Employment Served	2000 Jobs within ¼-mile of Alignment	85,996	99,645	98,812	90,840
Neighborhood Structure	Activity Centers within ¼-mile of Alignment	43	46	48	44
	Potential for Stations (i.e., Quantity and Quality of Access) - <i>Low/Medium/High</i>	Medium	High	High	High
Development Opportunity	Approved development - <i>Square footage or number of units of new office and retail, number of new residential units within ¼-mile of alignment</i>	Heritage Crossing; UMBA Biotech Park (480,000 SF Office); UMBA Dental School (367,000 SF High Rise); UMBA Student Dorms (337 bed High Rise); Center point (372 apt units); Marriott Residence Inn (125 DU); One Light Street Hotel (289 room hotel); Westin Hotel; Lockwood place; Flaghouse Courts Redevelopment; Bohagers Site/Fells Point (40 condos/325 apts unit); Inner Harbor East			
		-	Market Center; Convention Hotel	Market Center	
Cultural Resources	Individual Historic Properties within APE (w/ elevated sensitivity)	32 (13)	43 (13)	41 (15)	22 (9)
Streams	Crossings	0	0	1	2
100-Year Floodplains	Crossing(s) - <i>Linear Feet</i>	900	900	1,500	3,500
Intermodal Connections	Existing Bus Routes along Alignment	3	4	7	3
	Buses on Bus Routes along Alignment- <i># per day</i>	852	1,160	1,771	711
	Existing Bus Routes Intersected	31	30	30	22
	Estimated Transit Travel Time - <i>minutes</i>	18.4	17.4	18.0	20.3
Transit Dependency	2000 School-Aged Children within ¼-mile of Alignment	1,757	2,377	2,377	2,475

Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives			
		Saratoga Street	Baltimore/Fayette	Baltimore/Lombard	Lombard/ Pratt
		2.5 miles	2.5 miles	2.6 miles	2.6 miles
Traffic Characteristics	Average Daily Traffic along Alignment – Vehicles per day	9,000/ 19,000/ 1,000-11,000/ 12,000-22,000/ 8,000	40,000/ 60,000/ 1,000-11,000/ 12,000-21,000/ 8,000	40,000/ 60,000/ 1,000-11,000/ 11,000-37,000/ 8,000	40,000/ 60,000/ 11,000-37,000/ 11,000-43,000/ 8,000
	Existing Minimum Curb-to-Curb Width along Alignment – <i>Feet</i>	28	36	28	28
	Existing Minimum Right-of-Way Width along Alignment – <i>Feet</i>	50	58	50	50



Evaluation Measure with Benefit

For each of the evaluation criteria listed above, the following conclusions are made in the comparison of alternatives:

Employment Served

2000 Jobs within 1/4-mile of Alignment

- Approximately 10,000 to 15,000 more jobs are near the Baltimore/Fayette and Baltimore/Lombard Alternatives.

Neighborhood Structure

Activity Centers within 1/4-mile of Alignment

- In total, one to five fewer activity centers are near the Saratoga Street Alternative. In particular, the University of Maryland-Baltimore campus is furthest from this alternative. Furthermore, the Saratoga Street Alternative would provide reduced access to the stadiums, convention center and various tourist attractions.

Potential for Stations (i.e., Quantity and Quality of Access)

- The Saratoga Street Alternative would have less potential for stations to serve many riders along the alignment because the alignment is furthest from the University of Maryland-Baltimore campus and other larger downtown employers.

Development Opportunity

Approved Development

- Market Center and the Convention Hotel are further from the Saratoga Street Alternative than the other alternatives.

Cultural Resources

Individual Historic Properties within the Area of Potential Effect (APE)

- There are 10 to 20 fewer individual historic properties within the Area of Potential Effect (within approximately 500 feet of the alignment) for the Lombard/Pratt Alternative.

Streams

Crossings

- There are no open stream crossings for either the Saratoga Street or Baltimore/Fayette Alternatives.

100-Year Floodplains

Crossings

- The Saratoga Street and Baltimore/Fayette Alternatives have shorter crossings of the 100-year tidal floodplain associated with the Inner Harbor by as much as 2,400 feet.

Intermodal Connections

Existing Bus Routes along Alignment

- There are one to four more bus routes along the alignments of the Baltimore/Fayette and Baltimore/Lombard Alternatives.

Buses on Bus Routes along Alignment

- There are 300 to 1,000 more buses on bus routes along the alignments of the Baltimore/Fayette and Baltimore/Lombard Alternatives.

Existing Bus Routes Intersected

- Eight to nine fewer bus routes intersect the Lombard/Pratt Alternative.

Estimated Transit Travel Time

- The Lombard/Pratt Alternative would have an estimated transit travel time of two to three minutes slower than any of the other alternatives.

Transit Dependency

2000 School-Aged Children within ¼-mile of Alignment

- Approximately 600-700 fewer school-aged children reside near the Saratoga Street Alternative.

Traffic Characteristics

Average Daily Traffic along Alignment

- Saratoga and Saint Paul Streets have only a small fraction of the daily traffic that MLK Boulevard carries thus have less potential for conflict between existing traffic flow and the transitway.

Existing Minimum Curb-to-Curb and Right-of-Way Width

- Saratoga, Pratt and Lombard Streets have street and right-of-way widths which are narrower than the narrowest sections of Baltimore and Fayette Streets.

RECOMMENDATION

Based on the above evaluation, it is recommended that the Saratoga Street and Lombard/Pratt BRT Alternatives from the US 40 and Fremont Avenue to Central Avenue and Eastern Avenue not be carried forward for further study.

The rationale for this recommendation is summarized in the following points:

- 1) Based on the evaluation measures, the Baltimore/Fayette and Baltimore/Lombard Alternatives have more positive attributes when compared to the Saratoga Street and Lombard/Pratt Alternatives. In particular, these alternatives yield:
 - More activity centers nearby, particularly the University of Maryland-Baltimore
 - More jobs nearby (Baltimore/Fayette and Baltimore/Lombard)
 - More approved development nearby.
- 2) Specific reasons to eliminate the Saratoga Street Alternative include:
 - Fewest activity centers nearby, particularly the University of Maryland-Baltimore, one of downtown's largest employers
 - Fewest jobs nearby
 - Less approved development nearby
 - Less potential for stations.
- 3) Specific reasons to eliminate the Lombard/Pratt Alternative include:
 - Not as centrally located as the alternatives recommended for further study
 - Longest estimated transit travel time
 - Fewer jobs nearby
 - Most stream and floodplain crossings
 - Fewest buses on bus routes along the alignment
 - Fewest existing bus routes intersected.
- 4) When considering the other benefits exhibited by the other alternatives, examination of the advantages unique to the Saratoga Street Alternative does not warrant further study of the alternative. This is because less existing traffic on Saratoga and Saint Paul Streets than on MLK Boulevard is more of a result of the narrow roadways rather than offering opportunities for less conflict with existing traffic.
- 5) Furthermore, the advantage unique to the Lombard/Pratt Alternative, fewest individual historic properties within the Area of Potential Effect, does not warrant further study of the alternative because any effect from either the Baltimore/Fayette or Baltimore/Lombard Alternatives may be avoided or mitigated in the next phase of study through more refined development of the alternatives.

The following illustrates the alignment for the alternatives recommended for further study (Baltimore/Fayette and Baltimore/Lombard) in contrast to the alternatives recommended for no further study (Saratoga Street and Lombard/Pratt).

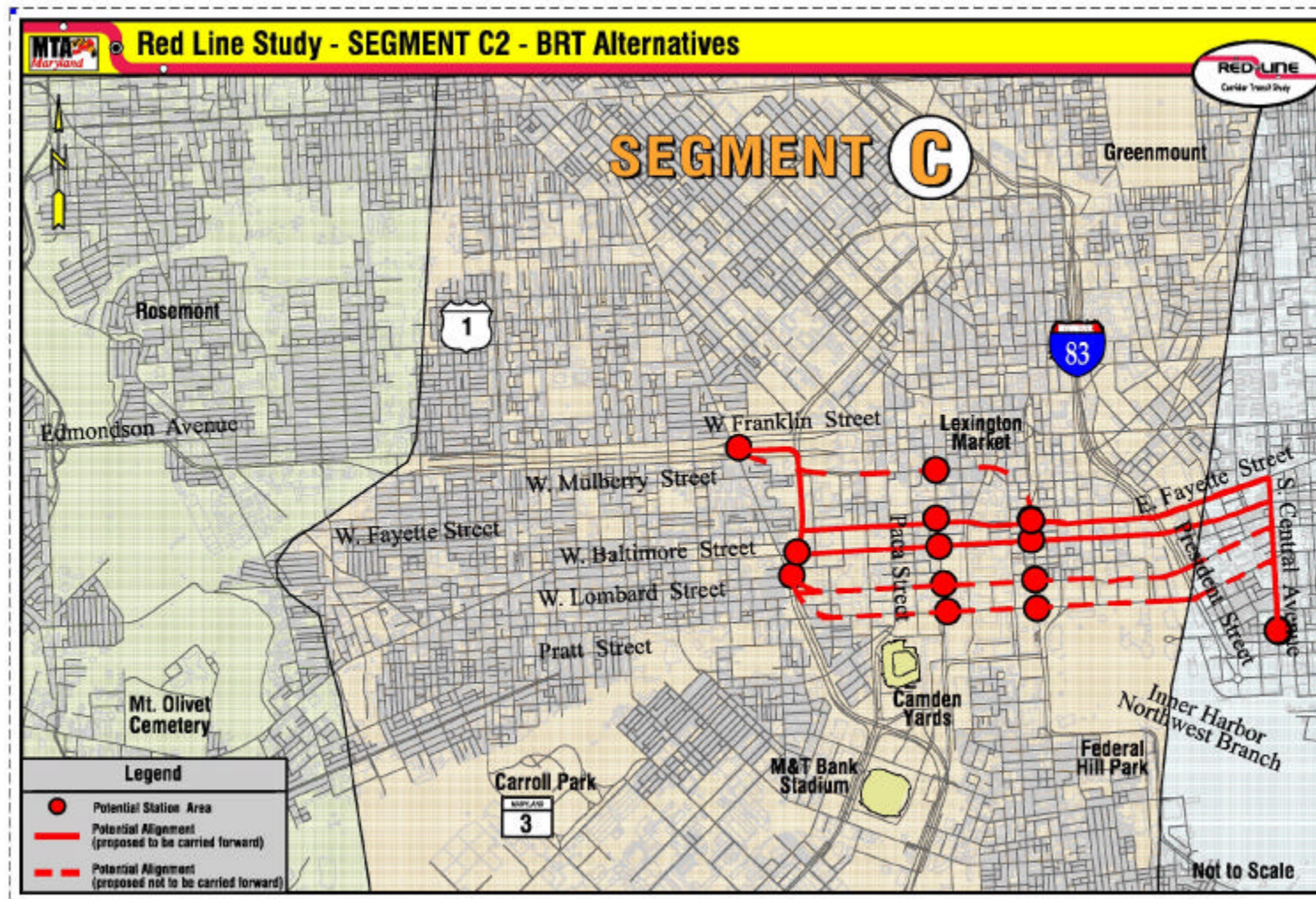


Figure 30: US 40 and Fremont Avenue to Central Avenue and Eastern Avenue BRT Alternatives Recommended for Further Study

OPTIONS NOT CARRIED FORWARD FOR FURTHER STUDY

The following are options to the alternatives evaluated above. These options were not evaluated in the same level of detail but are recommended for no further study as described below.

West Franklin or Mulberry Street – east of MLK Boulevard

Options to reach Baltimore, Fayette or Lombard Street include via a surface alignment along either West Franklin or Mulberry Street to a north-south street as described below.

Various North-South Streets

Options to reach Baltimore, Fayette or Lombard Street include the following north-south streets:

Greene Street	Paca Street
Eutaw Street	Howard Street
Hopkins Place	Charles Street
Saint Paul Street	Calvert Street
Guilford Street	Gay Street

These options are eliminated from further study for the following reasons:

- Best operational scenario is to have the east-west movement through downtown and to not require turns.
- Fremont (see below) or MLK offers best connection to support a continuous east-west through movement.
- Too far from UMB and its future development.

Lancaster Street

This option would provide more direct access to Inner Harbor East and is recommended for no further study because the better operational scenario would have the most continuous east-west movement with minimal turns.

OTHER OPTIONS FOR FURTHER STUDY

The following options were not evaluated in detail but are recommended for further study:

Fremont Avenue

An option for MLK Boulevard is via Fremont Avenue.

Baltimore Street (Two-Way)

An option for a one-way pair evaluated in the Baltimore/Fayette and Baltimore/Lombard Alternatives is a two-way transitway on Baltimore Street.

Harbor Magic Way

An option to Central Avenue is along the alignment of Harbor Magic Way from Market Place. This alignment would connect with extensions of Eastern Avenue, Fleet Street or Aliceanna Street.

The Fallsway

Another option to Central Avenue is along The Fallsway. This alignment would connect with extensions of Eastern Avenue, Fleet Street or Aliceanna Street.

President Street

Another option to Central Avenue is along President Street. This alignment would connect with extensions of Eastern Avenue, Fleet Street or Aliceanna Street.

SEGMENT C2: US 40 and Fremont Avenue to Central Avenue and Eastern Avenue
LRT Alternatives

DESCRIPTION OF LRT ALTERNATIVES

The following description summarizes the four LRT alternatives evaluated in the screening of preliminary alternatives for this segment. While variations of the following alternatives have been considered, each of the following was determined to be most representative of the respective alternative within this segment. In further study of the alternatives that are retained, design options will continue to be explored and evaluated as described at the end of this section.

Saratoga Street Alternative

The western terminus of this alternative would begin where the fully controlled access alignment of US 40 ends near Fremont Avenue. From this point the alignment would continue southeast to Saratoga Street at-grade and would follow Saratoga Street to the intersection with Saint Paul Street. At East Fayette Street, the transitway would be separated into one-way pairs. The eastbound transitway would follow Saint Paul Street to East Baltimore Street to its intersection with South Central Avenue. The westbound transitway would follow East Fayette Street from South Central Avenue to Saint Paul Street. At South Central Avenue, the transitway would resume two-way operation south along Central Avenue to the intersection of Eastern Avenue.

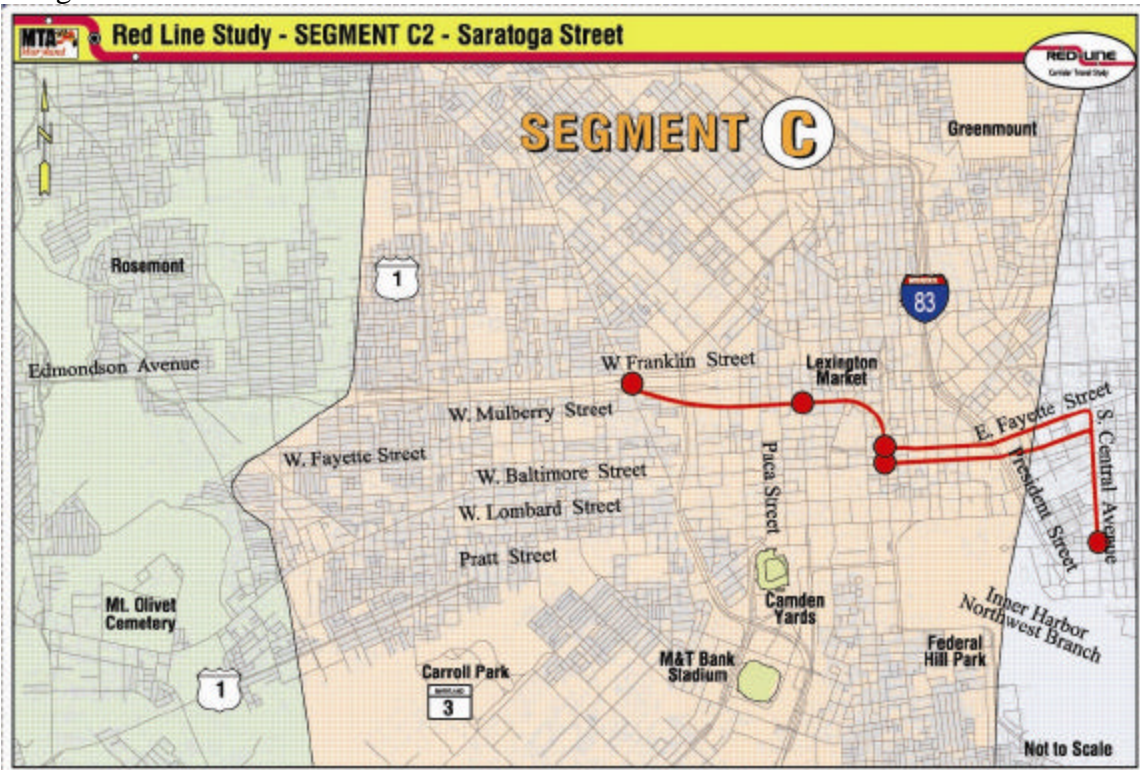


Figure 31: Saratoga Street Alternative from US 40 and Fremont Avenue to Central Avenue and Eastern Avenue (LRT)

Baltimore/Fayette Alternative

The western terminus of this alternative would begin where the fully controlled access alignment of US 40 ends near Fremont Avenue. From this point the alignment would continue east to Martin Luther King Junior (MLK) Boulevard and would turn south and follow MLK Boulevard to West Fayette Street. At West Fayette Street, the transitway would be separated into one-way pairs. The eastbound transitway would follow MLK Boulevard to Baltimore Street to its intersection with South Central Avenue. The westbound transitway would follow Fayette Street from South Central Avenue to MLK Boulevard. At South Central Avenue, the transitway would resume two-way operation south along Central Avenue to the intersection of Eastern Avenue.

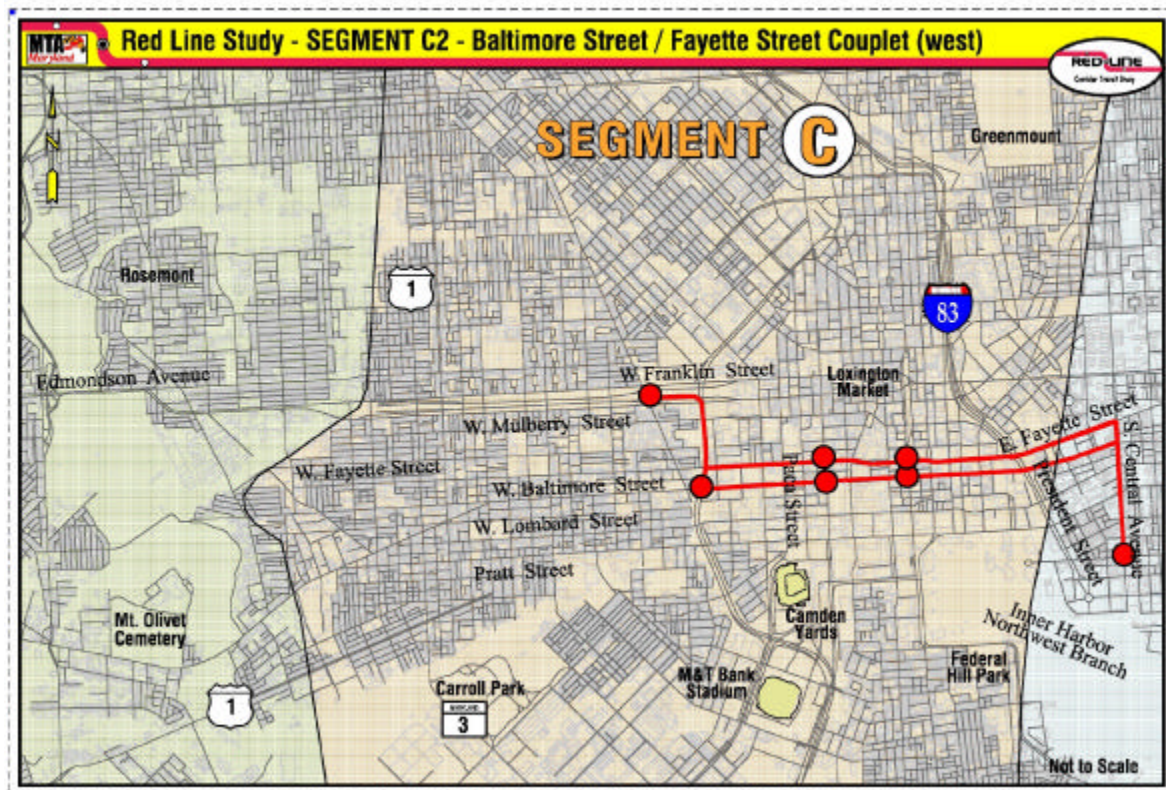


Figure 32: Baltimore/Fayette Alternative from US 40 and Fremont Avenue to Central Avenue and Eastern Avenue (LRT)

Baltimore/Lombard Alternative

The western terminus of this alternative would begin where the fully controlled access alignment of US 40 ends near Fremont Avenue. From this point the alignment would continue southeast to MLK Boulevard and would turn south and follow MLK Boulevard to West Baltimore Street. At West Baltimore Street, the transitway would be separated into one-way pairs. The eastbound transitway would follow Baltimore Street to its intersection with South Central Avenue. The westbound transitway would follow Lombard Street from South Central Avenue to MLK Boulevard. At South Central Avenue, the transitway would resume two-way operation south along Central Avenue to the intersection of Eastern Avenue.

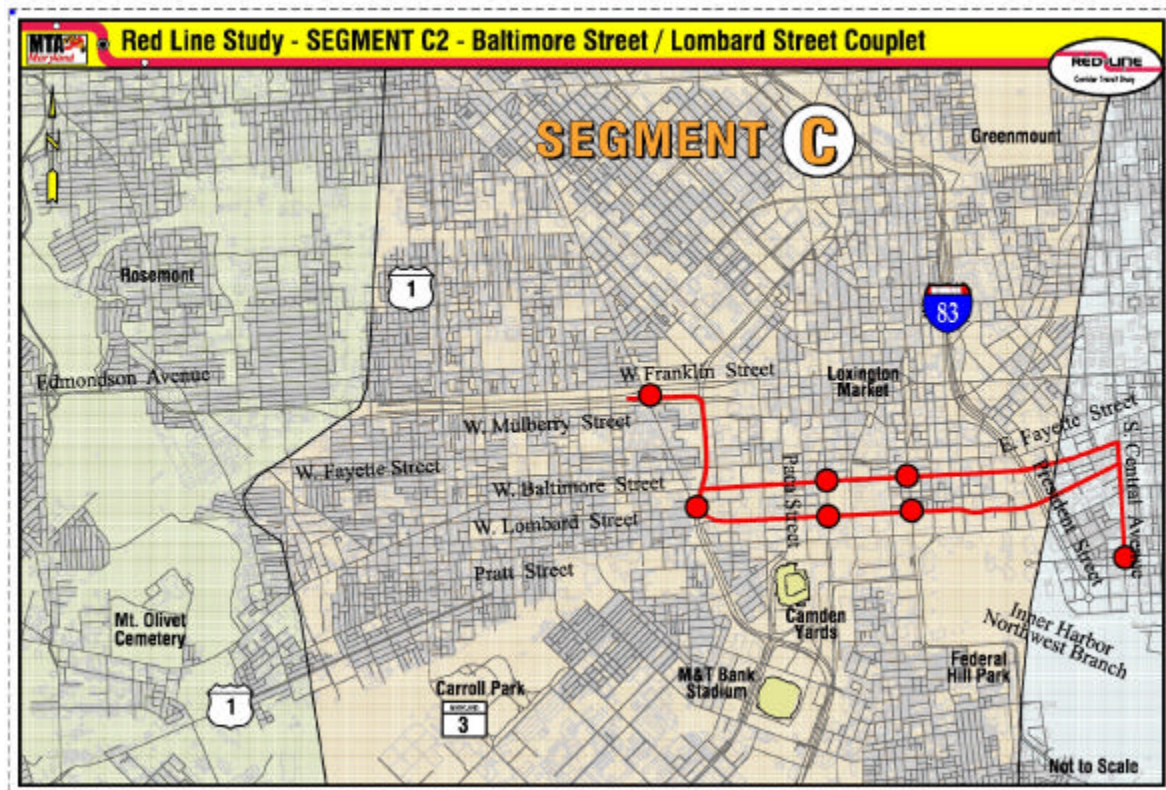


Figure 33: Baltimore/Lombard Alternative from US 40 and Fremont Avenue to Central Avenue and Eastern Avenue (LRT)

Lombard/Pratt Alternative

The western terminus of this alternative would begin where the fully controlled access alignment of US 40 ends near Fremont Avenue. From this point the alignment would continue southeast to MLK Boulevard and would turn south and follow MLK Boulevard to West Lombard Street. At West Lombard Street, the transitway would be separated into one-way pairs. The eastbound transitway would follow MLK Boulevard to Pratt Street to its intersection with South Central Avenue. The westbound transitway would follow Lombard Street from South Central Avenue to MLK Boulevard. At South Central Avenue, the transitway would resume two-way operation south along Central Avenue to the intersection of Eastern Avenue.

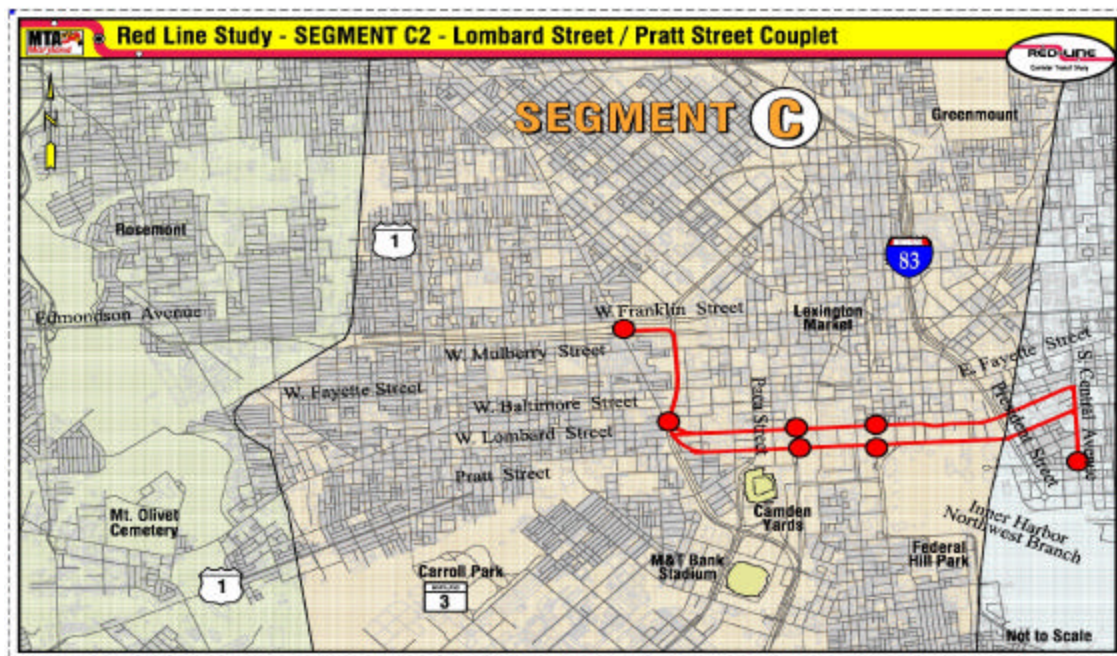


Figure 34: Lombard/Pratt Alternative from US 40 and Fremont Avenue to Central Avenue and Eastern Avenue (LRT)

EVALUATION OF ALTERNATIVES

Evaluation measures have been selected to reflect the various advantages and disadvantages of each alternative. These evaluation measures are being used for screening all preliminary alternatives for the entire Red Line corridor. The measures are also consistent with criteria prescribed in the FTA Project Justification Rating and Evaluation categories (*i.e.*, New Starts) as well as the Red Line Corridor project goals stated in the Purpose and Need. Definitions for the measures are included in the Appendix.

The following table summarizes the data for the LRT alternatives described above. Those measures that have been determined to have appreciable benefits when compared with other alternatives are shaded.

Table 15: Screening of Preliminary Alternatives, US 40 and Fremont Avenue to Central Avenue and Eastern Avenue (LRT)

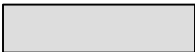
(Note: Shaded cells indicate measure with appreciable benefit.)

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives			
					Saratoga Street	Baltimore/ Fayette	Baltimore/ Lombard	Lombard/ Pratt
					2.5 miles	2.5 miles	2.6 miles	2.6 miles
Cost Effectiveness			Engineering Issues	Meets Design Criteria – <i>Yes or description of how criteria not met</i>	Max. Grade > 9%	Max. Grade > 8%	Max. Grade > 6%	Max. Grade > 6%
			Capital Costs	Preliminary Estimate - <i>millions</i>	N/A due to excessive grades	\$142-\$169	\$150-\$179	\$146-\$173
Support Community Revitalization and Economic Development	Impacts and Equity	Transit-Supportive Land Use	Population Served	2000 Population within ¼-mile of Alignment	23,225	25,770	25,770	26,714
				2025 Population within ¼-mile of Alignment	32,777	33,994	33,994	35,015
			Access to Transit	% of Minority Population within ¼-mile of Alignment	67.8%	69.2%	69.2%	69.9%
				% of Low-Income Population within ¼-mile of Alignment	34.6%	38.0%	38.0%	37.8%
			Employment Served	2000 People Living within ¼-mile of Alignment Who Are Employed	8,600	8,463	8,463	8,798
				2025 People Living within ¼-mile of Alignment Who Are Employed	12,137	11,164	11,164	11,532
				2000 Jobs within ¼-mile of Alignment	85,996	99,645	98,812	90,840
			Neighborhood Structure	Activity Centers within ¼-mile of Alignment (Neighborhood Shopping Center (and larger), Entertainment District/Tourist Attractions, and Institutions (schools, hospitals, etc.))	43	46	48	44
				Significant Barrier to Walkability/Access - <i>Yes/No</i>	No	No	No	No
				Potential for Stations (<i>i.e.</i> , Quantity and Quality of Access) - <i>Low/Medium/High</i>	Medium	High	High	High
				Housing Density within a ¼-mile of Alignment – <i>Average # of Dwelling Units per Acre</i>	11.9	10.6	10.6	11.1

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives			
					Saratoga Street	Baltimore/ Fayette	Baltimore/ Lombard	Lombard/ Pratt
					2.5 miles	2.5 miles	2.6 miles	2.6 miles
Support Community Revitalization and Economic Development	Impacts and Equity	Transit-Supportive Land Use	Development Opportunity	Presence of Empowerment Zones/Enterprise Zones/SNAPs/Revitalization Districts within a ¼ mile of Alignment – Yes/No	Yes	Yes	Yes	Yes
				Potential for Development within a ¼-mile of Alignment – <i>Low/Medium/High</i>	High	High	High	High
				Approved development - <i>Square footage or number of units of new office and retail, number of new residential units within ¼-mile of alignment</i>	Heritage Crossing; UMBA Biotech Park (480,000 SF Office); UMBA Dental School (367,000 SF High Rise); UMBA Student Dorms (337 bed High Rise); Center point (372 apt units); Marriott Residence Inn (125 DU); One Light Street Hotel (289 room hotel); Westin Hotel; Lockwood place; Flaghouse Courts Redevelopment; Bohagers Site/Fells Point (40 condos/325 apts unit); Inner Harbor East			
					-	Market Center; Convention Hotel	Market Center	
			Transit-Oriented Development (TOD) Opportunity	Potential Sites for TOD and Renaissance Opportunities	0	0	0	0
Environmental Stewardship	Impacts and Equity	Environmental Benefits	Cultural Resources	Historic Districts within Area of Potential Effect (APE) (w/ elevated sensitivity)	10 (4)	12 (4)	13 (4)	13 (5)
				Individual Historic Properties within APE (w/ elevated sensitivity)	32 (13)	43 (13)	41 (15)	22 (9)
				Known Archeological Resources within APE	14	14	19	15
			Parklands	Number of Potentially Impacted Urban Lots	4-edge and 1 proximity	6- edge	7-edge and 1 proximity	3-edge and 1 proximity
				Number of Potentially Impacted Passive Parks	4- edge	3- proximity	2- edge	2- edge
				Number of Potentially Impacted Play Lots	1- proximity	1- proximity	1- proximity	1- proximity
				Number of Potentially Impacted Regional Parks	0	0	0	0
				Number of Potentially Impacted Open Spaces	0	0	0	0

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives			
					Saratoga Street	Baltimore/ Fayette	Baltimore/ Lombard	Lombard/ Pratt
					2.5 miles	2.5 miles	2.6 miles	2.6 miles
Environmental Stewardship	Impacts and Equity	Environmental Benefits	Noise	Potential for Impact to Receptors along Alignment (houses, churches, hospitals, parks, etc.) – <i>Low/Medium/High</i>	Low	Low	Low	Low
			Wetlands	Type (Potential for Impacts)	none	none	none	none
			Streams	Crossings	0	0	1	2
			Forests	Crossing(s) - <i>Linear Feet</i>	0	0	0	0
			100-Year Floodplains	Crossing(s) - <i>Linear Feet</i>	900	900	1,500	3,500
			Hazardous Material Sites	Potential Sites (Potential Risk)	9 (Moderate) 0 (Severe)	6 (Moderate) 0 (Severe)	6 (Moderate) 0 (Severe)	6 (Moderate) 0 (Severe)
			Rare, Threatened & Endangered Species Habitat	Area of Potential Habitat – <i>Acres</i>	120	121	122	123
					1,200 ft. radius from source			
Improve Transit System Connectivity	Effectiveness	Mobility and Operating Efficiencies	Intermodal Connections	Connection to Existing MARC – <i>Yes/No/Not Applicable (N/A)</i> / Quality of Connection – <i>High/Med/Low</i>	N/A	Yes/Low	Yes/Low	Yes/Med
				Connection to Existing Metro – <i>Yes/No/ Quality of Connection</i> – <i>High/Med/Low</i>	Yes/High	Yes/Med- High	Yes/Med-High	Yes/Med
				Connection to Existing Light Rail – <i>Yes/No/ Quality of</i> Connection – <i>High/Med/Low</i>	Yes/Med	Yes/High	Yes/High	Yes/Hlgh
				Existing Bus Routes along Alignment	3	4	7	3
				Buses on Bus Routes along Alignment- <i># per day</i>	852	1,160	1,771	711
				Existing Bus Routes Intersected	31	30	30	22
				Buses on Intersecting Bus Routes - <i># per day</i>	>2,000	>2,000	>2,000	>2,000
				Estimated Transit Travel Time - <i>minutes</i>	18.4	17.4	18.0	20.3
				Potential Location along the Alignment for a Major Park & Ride – <i>Yes/No</i>	No	No	No	No

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives			
					Saratoga Street	Baltimore/ Fayette	Baltimore/ Lombard	Lombard/ Pratt
					2.5 miles	2.5 miles	2.6 miles	2.6 miles
Improve Transit System Connectivity	Effectiveness	Mobility and Operating Efficiencies	Intermodal Connections	Existing Pedestrian Level of Service (LOS) along Alignment	N/A	A-C	N/A	A-C
				Existing Bicycle LOS along Alignment	N/A	D-E	N/A	D-E
				Access to Existing/Planned Bicycle Trails along Alignment – Yes/No	Yes	Yes	Yes	Yes
Transit Dependency			2000 Zero-Car Households within ¼-mile of Alignment	6,595	6,534	6,534	6,777	
			2000 Households within ¼-mile of Alignment	14,142	14,444	14,444	14,933	
			2000 Senior Citizens within ¼-mile of Alignment	3,295	3,339	3,339	3,461	
			2000 School-Aged Children within ¼-mile of Alignment	1,757	2,377	2,377	2,475	
Traffic Characteristics			Intersections (signalized and unsignalized) along Alignment	54	69	64	67	
			Signalized Intersections along Alignment	30	42	40	46	
			Major Intersections along Alignment	19	26	27	28	
			Average Daily Traffic along Alignment – <i>Vehicles per day</i>	9,000/19,000/1,000-11,000/12,000-22,000/8,000	40,000/60,000/1,000-11,000/12,000-21,000/8,000	40,000/60,000/1,000-11,000/37,000/8,000	40,000/60,000/11,000-37,000/11,000-43,000/8,000	
			Travel Lanes in Peak Direction	1-4	1-3	1-6	1-6	
			Existing Minimum Curb-to-Curb Width along Alignment – <i>Feet</i>	28	36	28	28	
			Existing Minimum Right-of-Way Width along Alignment – <i>Feet</i>	50	58	50	50	
			On-Street Parking – <i>Yes or No, length of parking eastbound (EB), length of parking westbound (WB)</i>	Yes EB = 1.2 miles; WB = 1.0 miles	Yes EB = 1.1 miles; WB = 1.3 miles	Yes EB = 0.4 miles; WB = 1.1 miles	Yes EB = 0.0; WB = 0.5 miles	



Evaluation Measure with Benefit

The following table highlights the evaluation measures only for which it was determined there is appreciable difference among alternatives. For these measures, the shaded cells indicate those with appreciable benefit compared with the other alternatives.

Table 16: Summary of Evaluation Criteria and Measures with Appreciable Benefit, US 40 and Fremont Avenue to Central Avenue and Eastern Avenue (LRT)

Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives			
		Saratoga Street	Baltimore/ Fayette	Baltimore/ Lombard	Lombard/ Pratt
		2.5 miles	2.5 miles	2.6 miles	2.6 miles
Engineering Issues	Meets Design Criteria – <i>Yes or description of how criteria not met</i>	Max. Grade > 9%	Max. Grade > 8%	Max. Grade > 6%	Max. Grade > 6%
Employment Served	2000 Jobs within ¼-mile of Alignment	85,996	99,645	98,812	90,840
Neighborhood Structure	Activity Centers within ¼-mile of Alignment	43	46	48	44
	Potential for Stations (i.e., Quantity and Quality of Access) - <i>Low/Medium/High</i>	Medium	High	High	High
Development Opportunity	Approved development - <i>Square footage or number of units of new office and retail, number of new residential units within ¼-mile of alignment</i>	Heritage Crossing; UMBA Biotech Park (480,000 SF Office); UMBA Dental School (367,000 SF High Rise); UMBA Student Dorms (337 bed High Rise); Center point (372 apt units); Marriott Residence Inn (125 DU); One Light Street Hotel (289 room hotel); Westin Hotel; Lockwood place; Flaghouse Courts Redevelopment; Bohagers Site/Fells Point (40 condos/325 apts unit); Inner Harbor East			
		-	Market Center; Convention Hotel	Market Center	
Cultural Resources	Individual Historic Properties within APE (w/ elevated sensitivity)	32 (13)	43 (13)	41 (15)	22 (9)
Streams	Crossings	0	0	1	2
100-Year Floodplains	Crossing(s) - <i>Linear Feet</i>	900	900	1,500	3,500
Intermodal Connections	Existing Bus Routes along Alignment	3	4	7	3
	Buses on Bus Routes along Alignment- <i># per day</i>	852	1,160	1,771	711
	Existing Bus Routes Intersected	31	30	30	22
	Estimated Transit Travel Time - <i>minutes</i>	18.4	17.4	18.0	20.3
Transit Dependency	2000 School-Aged Children within ¼-mile of Alignment	1,757	2,377	2,377	2,475

Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives			
		Saratoga Street	Baltimore/Fayette	Baltimore/Lombard	Lombard/ Pratt
		2.5 miles	2.5 miles	2.6 miles	2.6 miles
Traffic Characteristics	Average Daily Traffic along Alignment – Vehicles per day	9,000/ 19,000/ 1,000-11,000/ 12,000-22,000/ 8,000	40,000/ 60,000/ 1,000-11,000/ 12,000-21,000/ 8,000	40,000/ 60,000/ 1,000-11,000/ 11,000-37,000/ 8,000	40,000/ 60,000/ 11,000-37,000/ 11,000-43,000/ 8,000
	Existing Minimum Curb-to-Curb Width along Alignment – <i>Feet</i>	28	36	28	28
	Existing Minimum Right-of-Way Width along Alignment – <i>Feet</i>	50	58	50	50



Evaluation Measure with Benefit

For each of the evaluation criteria listed above, the following conclusions are made in the comparison of alternatives:

Engineering Issues

- The Baltimore/Fayette Alternative would require grades in excess of 8% which is not desirable. For the Saratoga Street Alternative, the grade between Charles Street and Saint Paul Street is in excess of 9%, which exceeds the maximum allowable grade for LRT per the design criteria established for the Red Line Corridor.

Employment Served

2000 Jobs within 1/4-mile of Alignment

- Approximately 10,000 to 15,000 more jobs are near the Baltimore/Fayette and Baltimore/Lombard Alternatives.

Neighborhood Structure

Activity Centers within 1/4-mile of Alignment

- In total, one to five fewer activity centers are near the Saratoga Street Alternative. In particular, the University of Maryland-Baltimore campus is furthest from this alternative. Furthermore, the Saratoga Street Alternative would provide reduced access to the stadiums, convention center and various tourist attractions.

Potential for Stations (i.e., Quantity and Quality of Access)

- The Saratoga Street Alternative would have less potential for stations to serve many riders along the alignment because the alignment is furthest from the University of Maryland-Baltimore campus and other larger downtown employers.

Development Opportunity

Approved Development

- Market Center and the Convention Hotel are further from the Saratoga Street Alternative than the other alternatives.

Cultural Resources

Individual Historic Properties within the Area of Potential Effect (APE)

- There are 10 to 20 fewer individual historic properties within the Area of Potential Effect (within approximately 500 feet of the alignment) for the Lombard/Pratt Alternative.

Streams

Crossings

- There are no open stream crossings for either the Saratoga Street or Baltimore/Fayette Alternatives.

100-Year Floodplains

Crossings

- The Saratoga Street and Baltimore/Fayette Alternatives have shorter crossings of the 100-year tidal floodplain associated with the Inner Harbor by as much as 2,400 feet.

Intermodal Connections

Existing Bus Routes along Alignment

- There are one to four more bus routes along the alignments of the Baltimore/Fayette and Baltimore/Lombard Alternatives.

Buses on Bus Routes along Alignment

- There are 300 to 1,000 more buses on bus routes along the alignments of the Baltimore/Fayette and Baltimore/Lombard Alternatives.

Existing Bus Routes Intersected

- Eight to nine fewer bus routes intersect the Lombard/Pratt Alternative.

Estimated Transit Travel Time

- The Lombard/Pratt Alternative would have an estimated transit travel time of two to three minutes slower than any of the other alternatives.

Transit Dependency

2000 School-Aged Children within ¼-mile of Alignment

- Approximately 600-700 fewer school-aged children reside near the Saratoga Street Alternative.

Traffic Characteristics

Average Daily Traffic along Alignment

- Saratoga and Saint Paul Streets have only a small fraction of the daily traffic that MLK Boulevard carries thus have less potential for conflict between existing traffic flow and the transitway.

Existing Minimum Curb-to-Curb and Right-of-Way Width

- Saratoga, Pratt and Lombard Streets have street and right-of-way widths which are narrower than the narrowest sections of Baltimore and Fayette Streets.

RECOMMENDATION

Based on the above evaluation, it is recommended that the Saratoga Street and Lombard/Pratt LRT Alternatives from the US 40 and Fremont Avenue to Central Avenue and Eastern Avenue not be carried forward for further study.

The rationale for this recommendation is summarized in the following points:

- 1) Based on the evaluation measures, the Baltimore/Fayette and Baltimore/Lombard Alternatives have more positive attributes when compared to the Saratoga Street and Lombard/Pratt Alternatives. In particular, these alternatives yield:
 - More activity centers nearby, particularly the University of Maryland-Baltimore
 - More jobs nearby (Baltimore/Fayette and Baltimore/Lombard)
 - More approved development nearby.
- 2) Specific reasons to eliminate the Saratoga Street Alternative include:
 - Fewest activity centers nearby, particularly the University of Maryland-Baltimore, one of downtown's largest employers
 - Fewest jobs nearby
 - Less approved development nearby
 - Less potential for stations
 - Excessive grades on several segments of the alignment.
- 3) Specific reasons to eliminate the Lombard/Pratt Alternative include:
 - Not as centrally located as the alternatives recommended for further study
 - Longest estimated transit travel time
 - Fewer jobs nearby
 - Most stream and floodplain crossings
 - Fewest buses on bus routes along the alignment
 - Fewest existing bus routes intersected.
- 4) When considering the other benefits exhibited by the other alternatives, examination of the advantages unique to the Saratoga Street Alternative does not warrant further study of the alternative. This is because less existing traffic on Saratoga and Saint Paul Streets than on MLK Boulevard is more of a result of the narrow roadways rather than offering opportunities for less conflict with existing traffic.
- 5) Furthermore, the advantage unique to the Lombard/Pratt Alternative, fewest individual historic properties within the Area of Potential Effect, does not warrant further study of the alternative because any effect from either the Baltimore/Fayette or Baltimore/Lombard Alternatives may be avoided or

mitigated in the next phase of study through more refined development of the alternatives.

The following illustrates the alignment for the alternatives recommended for further study (Baltimore/Fayette and Baltimore/Lombard) in contrast to the alternative recommended for no further study (Saratoga Street and Lombard/Pratt).

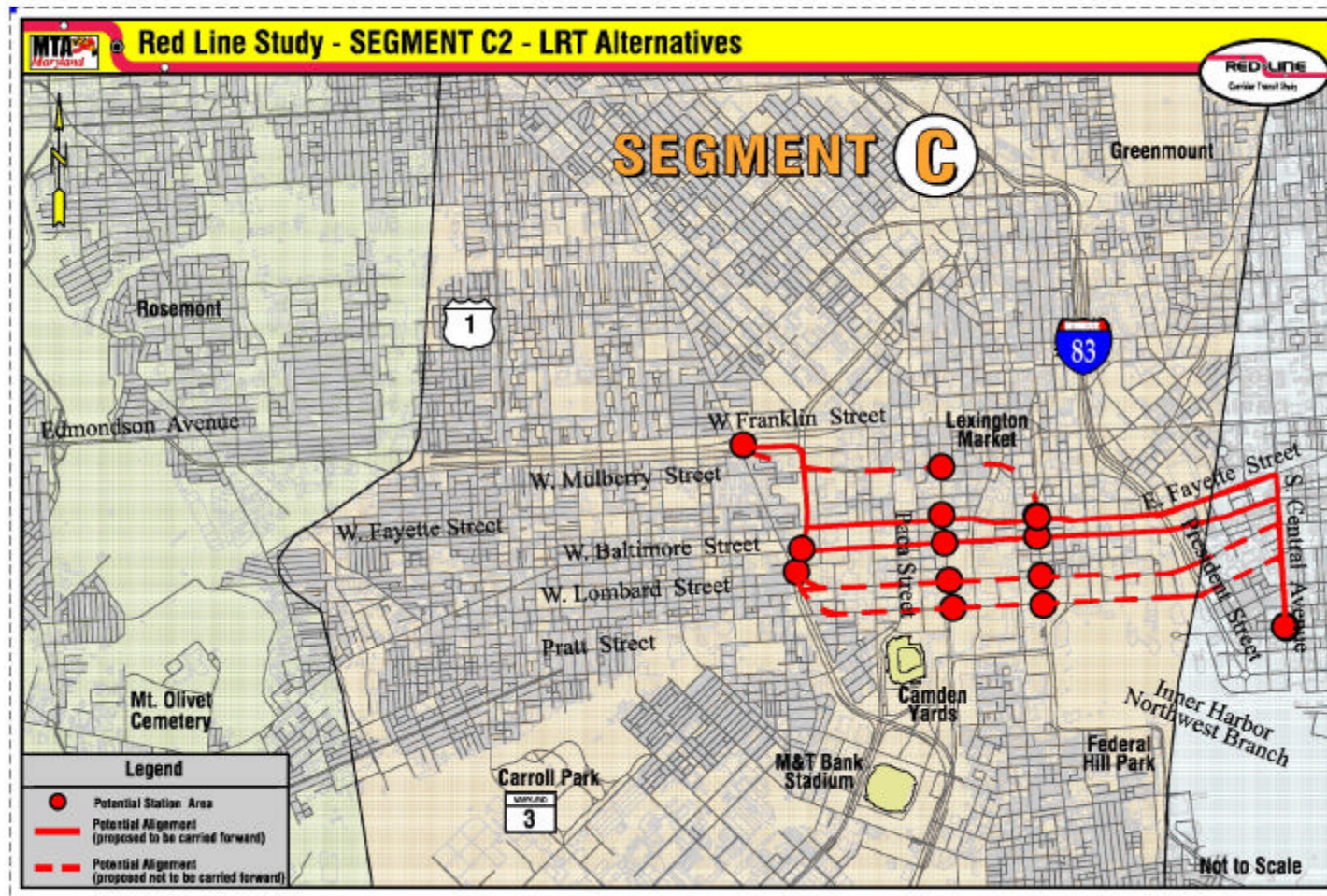


Figure 35: US 40 and Fremont Avenue to Central Avenue and Eastern Avenue LRT Alternatives Recommended for Further Study

OPTIONS NOT CARRIED FORWARD FOR FURTHER STUDY

The following are options to the alternatives evaluated above. These options were not evaluated in the same level of detail and are recommended for no further study as described below.

West Franklin or Mulberry Street – east of MLK Boulevard

Options to reach Baltimore, Fayette or Lombard Street include via a surface alignment along either West Franklin or Mulberry Street to a north-south street as described below.

Various North-South Streets

Options to reach Baltimore, Fayette or Lombard Street include the following north-south streets:

Paca Street
Howard Street

Eutaw Street
Saint Paul Street

These options are eliminated from further study for the following reasons:

- Best operational scenario is to have the east-west movement through downtown and to not require turns. This is particularly true for LRT given the turning radii needed.
- Fremont (see below) or MLK offers best connection to support a continuous east-west through movement.
- Too far from UMB and its future development.

Lancaster Street

This option would provide more direct access to Inner Harbor East and was recommended for no further study because the better operational scenario would have the most continuous east-west movement with minimal turns. This is particularly true for LRT given the turning radii needed.

OTHER OPTIONS FOR FURTHER STUDY

The following options were not evaluated in detail but are recommended for further study:

Fremont Avenue

A option for MLK Boulevard is via Fremont Avenue.

Baltimore Street (Two-Way)

An option for a one-way pair evaluated in the Baltimore/Fayette and Baltimore/Lombard Alternatives is a two-way transitway on Baltimore Street.

Harbor Magic Way

An option to Central Avenue is along the alignment of Harbor Magic Way from Market Place. This alignment would connect with extensions of Eastern Avenue, Fleet Street or Aliceanna Street.

The Fallsway

Another option to Central Avenue is along The Fallsway. This alignment would connect with extensions of Eastern Avenue, Fleet Street or Aliceanna Street.

President Street

Another option to Central Avenue is along President Street. This alignment would connect with extensions of Eastern Avenue, Fleet Street or Aliceanna Street.

SEGMENT D: Central Avenue at Eastern Avenue to Eastern Terminus **BRT Alternatives**

DESCRIPTION OF BRT ALTERNATIVES

The following description summarizes the four BRT alternatives evaluated in the screening of preliminary alternatives for this segment. While variations of the following alternatives have been considered, each of the following was determined to be most representative of the respective alternative within this segment. In further study of the alternatives that are retained, design options will continue to be explored and evaluated as described at the end of this section.

Eastern Avenue Alternative

The western terminus of this alternative would begin at the intersection of South Central Avenue and Eastern Avenue. The alignment would continue east and at-grade along Eastern Avenue to Linwood Avenue.

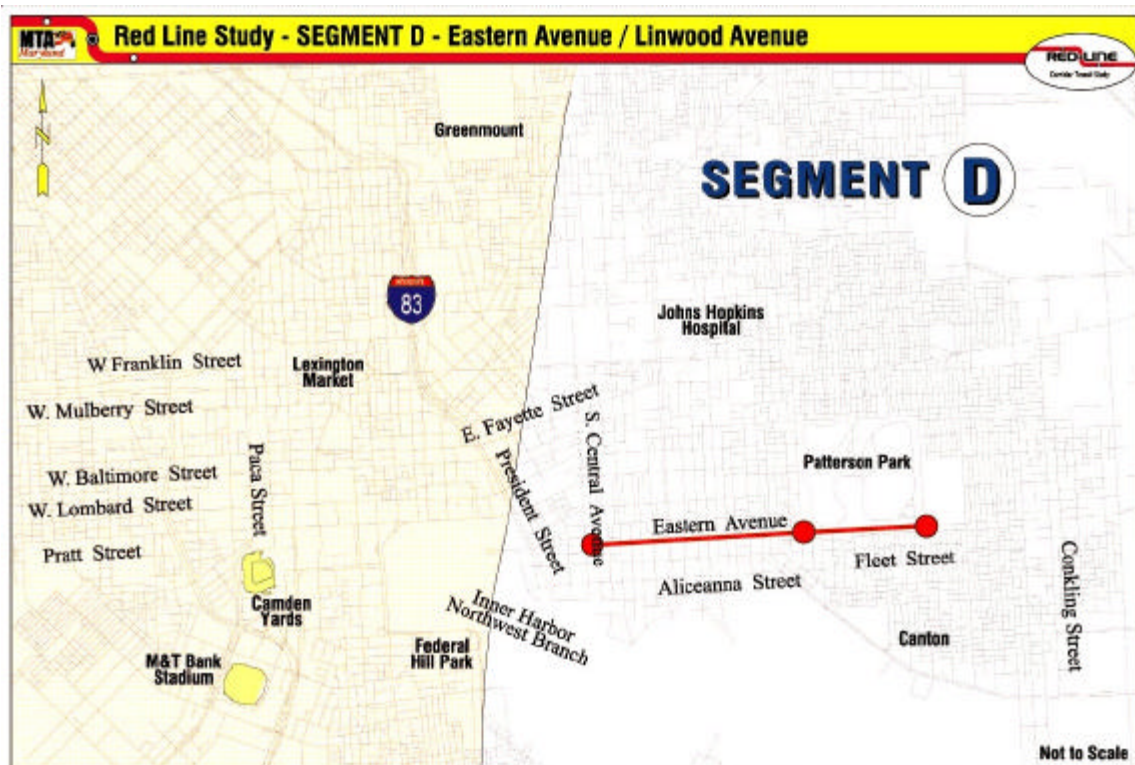


Figure 36: Eastern Avenue from Central Avenue to Eastern Terminus (BRT)

Eastern Avenue/Fleet Street Alternative

The western terminus of this alternative would begin at the intersection of South Central Avenue and Eastern Avenue. The transitway would be separated into one-way pairs. The eastbound transitway would follow Fleet Street at-grade to Linwood Avenue. The westbound transitway would follow Eastern Avenue at-grade from Linwood Avenue to South Central Avenue.

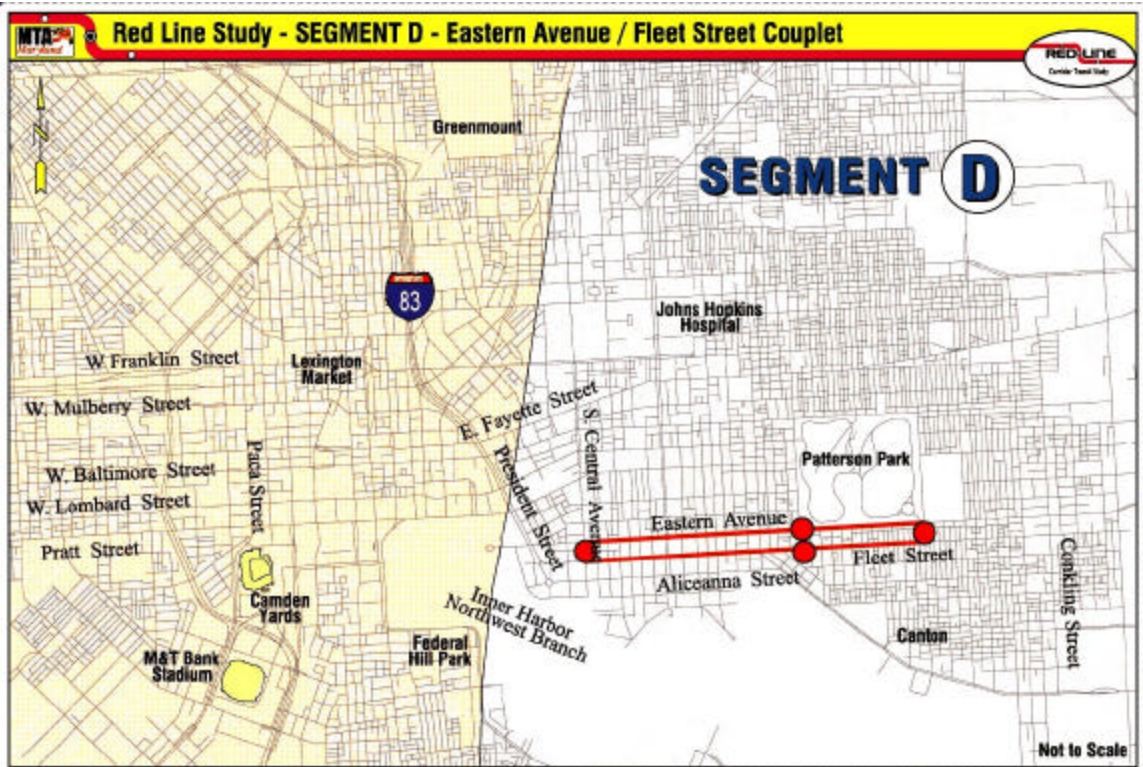


Figure 37: Eastern Avenue/Fleet Street Alternative from Central Avenue to Eastern Terminus (BRT)

Eastern Avenue/Boston Street Alternative

The western terminus of this alternative would begin at the intersection of South Central Avenue and Eastern Avenue. The alignment would proceed east and at-grade along Eastern Avenue to Chester Street. At Chester Street the alignment would turn south and continue at-grade to Boston Street. At Boston Street the alignment would turn southeast and follow Boston Street at-grade to the eastern terminus at Conkling Street.

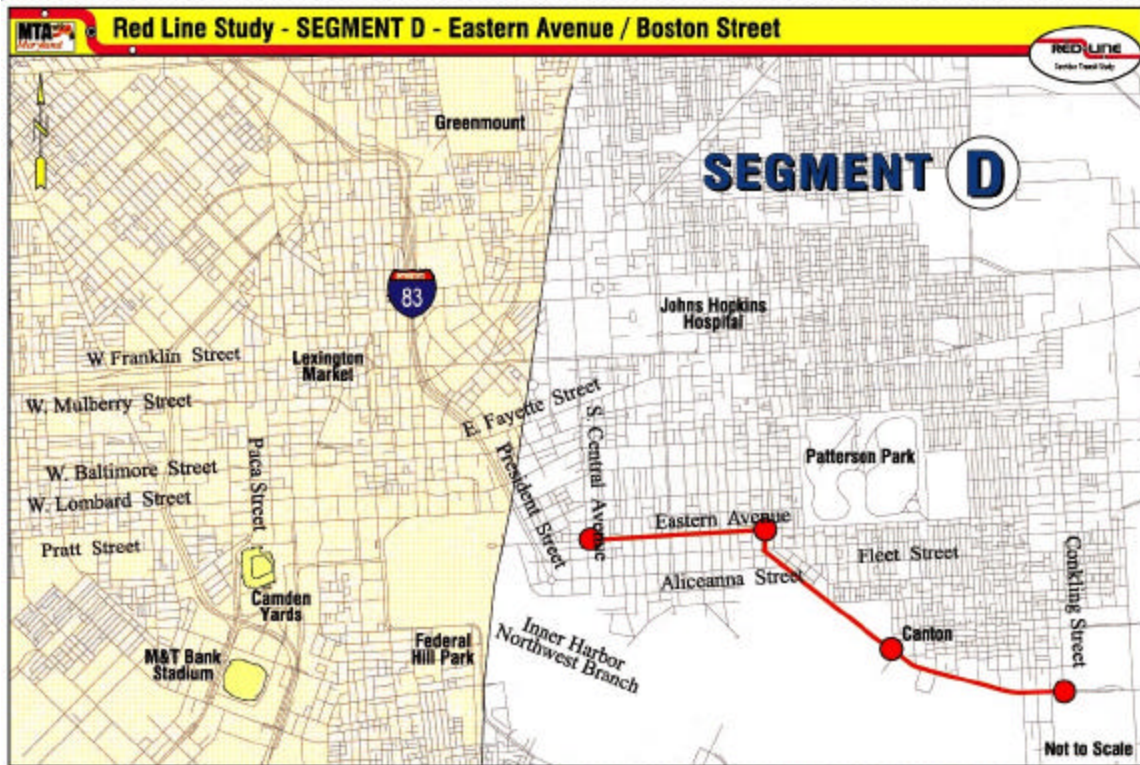


Figure 38: Eastern Avenue/Boston Street Alternative from Central Avenue to Eastern Terminus (BRT)

Eastern/Boston/Conkling Loop Alternative

The western terminus of this alternative would begin at the intersection of South Central Avenue and Eastern Avenue. The alignment would proceed east, two-way and at-grade along Eastern Avenue to Chester Street. At Chester Street, the alternative would proceed as a one-way loop. Only the eastbound transitway would turn south onto Chester Street to Boston Street. The alignment would continue one-way and at-grade along Boston Street to Conkling Street. At Conkling Street, the one-way transitway would turn north and continue along Conkling Street to Eastern Avenue. At Eastern Avenue, the alternative would turn west to Chester Street to then begin two-way operation west of Chester Street.

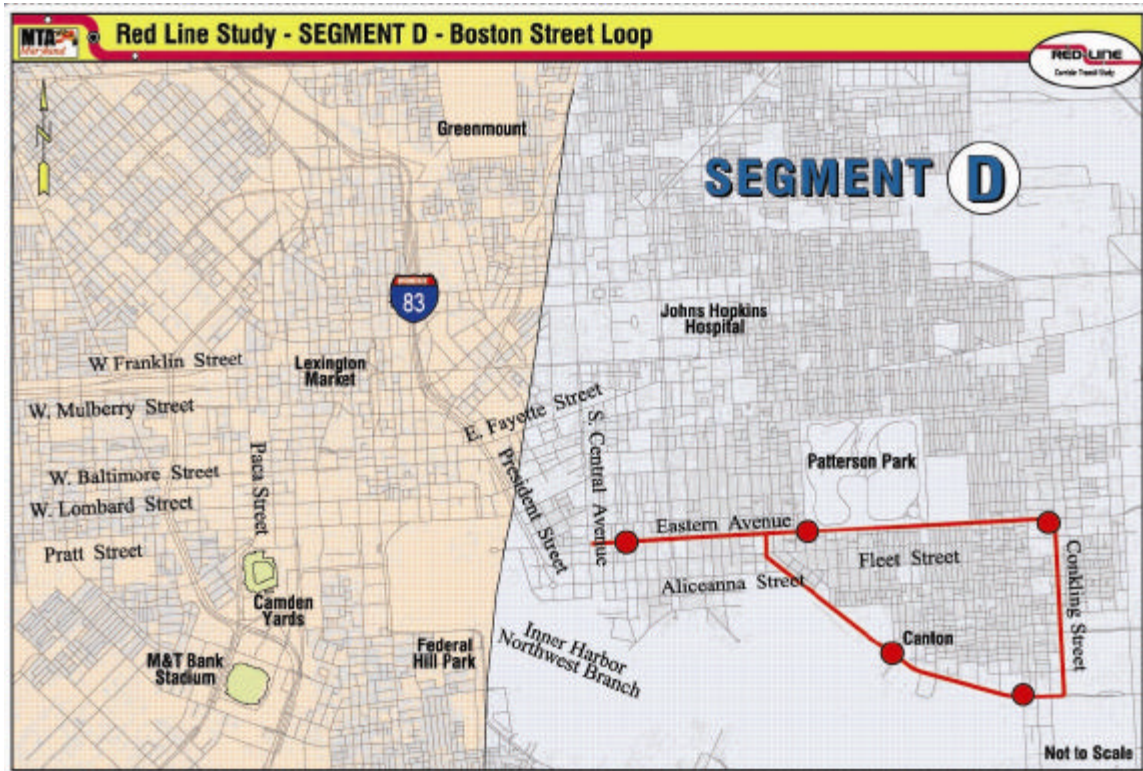


Figure 39: Eastern/Boston/Conkling Loop Alternative from Central Avenue to Eastern Terminus (BRT)

EVALUATION OF ALTERNATIVES

Evaluation measures have been selected to reflect the various advantages and disadvantages of each alternative. These evaluation measures are being used for screening all preliminary alternatives for the entire Red Line corridor. The measures are also consistent with criteria prescribed in the FTA Project Justification Rating and Evaluation categories (*i.e.*, New Starts) as well as the Red Line Corridor project goals stated in the Purpose and Need. Definitions for the measures are included in the Appendix.

The following table summarizes the data for the BRT alternatives described above. Those measures that have been determined to have appreciable benefits when compared with other alternatives are shaded.

Table 17: Screening of Preliminary Alternatives, Central Avenue to Eastern Terminus (BRT)

(Note: Shaded cells indicate measure with appreciable benefit.)

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives			
					Eastern Avenue	Eastern/ Fleet	Eastern/ Boston	Eastern/ Boston/ Conkling Loop
					1.3 Miles	1.3 Miles	2.0 Miles	3.7 Miles
Cost Effectiveness			Engineering Issues	Meets Design Criteria – <i>Yes or description of how criteria not met</i>	Yes	Yes	Yes	Yes
			Capital Costs	Preliminary Estimate - <i>millions</i>	\$25-\$32	\$31-\$40	\$39-\$50	\$49-\$63
Support Community Revitalization and Economic Development	Impacts and Equity	Transit- Supportive Land Use	Population Served	2000 Population within ¼-mile of Alignment	20,252	21,044	18,725	29,661
				2025 Population within ¼-mile of Alignment	24,840	25,811	21,383	36,434
			Access to Transit	% of Minority Population within ¼-mile of Alignment	21.6%	20.9%	19.5%	18.6%
				% of Low-Income Population within ¼-mile of Alignment	20.2%	19.8%	19.6%	20.1%
			Employment Served	2000 People Living within ¼-mile of Alignment Who Are Employed	9,914	10,388	9,701	14,127
				2025 People Living within ¼-mile of Alignment Who Are Employed	12,160	12,741	11,078	17,353
				2000 Jobs within ¼-mile of Alignment	6,333	7,444	7,552	10,026
			Neighborhood Structure	Activity Centers within ¼-mile of Alignment (Neighborhood Shopping Center (and larger), Entertainment District/Tourist Attractions, and Institutions (schools, hospitals, etc.))	18	19	18	27
				Significant Barrier to Walkability/Access - <i>Yes/No</i>	No	No	No	No
				Potential for Stations (<i>i.e.</i> , Quantity and Quality of Access) - <i>Low/Medium/High</i>	Medium	Medium	Medium	Medium
				Housing Density within a ¼-mile of Alignment – <i>Average # of Dwelling Units per Acre</i>	17.5	17.6	14.7	15.4

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives			
					Eastern Avenue	Eastern/ Fleet	Eastern/ Boston	Eastern/ Boston/ Conkling Loop
					<i>1.3 Miles</i>	<i>1.3 Miles</i>	<i>2.0 Miles</i>	<i>3.7 Miles</i>
Support Community Revitalization and Economic Development	Impacts and Equity	Transit-Supportive Land Use	Development Opportunity	Presence of Empowerment Zones/Enterprise Zones/SNAPs/Revitalization Districts within a ¼ mile of Alignment – Yes/No	Yes	Yes	Yes	Yes
				Potential for Development within a ¼-mile of Alignment – <i>Low/Medium/High</i>	High	High	High	High
			Transit-Oriented Development (TOD) Opportunity	Approved development - <i>Square footage or number of units of new office and retail, number of new residential units within ¼-mile of alignment</i>	Inner Harbor East (2.4 M SF Office, 575,000 SF retail, 1,019 DU); Bohagers Site/Fells Point (40 condos, 325 apts); Bond Street Wharf (100 apts); Aliceanna Project (284 apts, 13,000 SF retail); Union Wharf (350 DU)			
				-	Canton; Canton Crossing			
		Transit-Oriented Development (TOD) Opportunity	Potential Sites for TOD and Renaissance Opportunities	0	0	1	1	
Environmental Stewardship		Environmental Benefits	Cultural Resources	Historic Districts within Area of Potential Effect (APE) (w/ elevated sensitivity)	7 (1)	7 (1)	5 (1)	7 (1)
				Individual Historic Properties within APE (w/ elevated sensitivity)	4 (1)	4 (1)	4 (1)	4 (1)
				Known Archeological Resources within APE	0	2	1	1
			Parklands	Number of Potentially Impacted Urban Lots	0	0	1-edge	1-edge
				Number of Potentially Impacted Passive Parks	0	0	3-edge	3-edge
	Number of Potentially Impacted Play Lots			0	0	1-edge	1-edge	
	Number of Potentially Impacted Regional Parks			1-edge	1-edge	0	1-edge	
	Number of Potentially Impacted Open Spaces			0	0	1-proximity	1-proximity	
	Noise		Potential for Impact to Receptors along Alignment (houses, churches, hospitals, parks, etc.) – <i>Low/Medium/High</i>	Low	Low	Low	Low	
	Wetlands		Type (Potential for Impacts)	None	None	None	None	
	Streams		Crossings	0	0	0	0	
	Forests		Crossing(s) - <i>Linear Feet</i>	0	0	0	0	

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives			
					Eastern Avenue	Eastern/ Fleet	Eastern/ Boston	Eastern/ Boston/ Conkling Loop
					1.3 Miles	1.3 Miles	2.0 Miles	3.7 Miles
Environmental Stewardship	Impacts and Equity	Environmental Benefits	100-Year Floodplains	Crossing(s) - <i>Linear Feet</i>	300	300	300	300
			Hazardous Material Sites	Potential Sites (Potential Risk)	4 (Moderate) 0 (Severe)	8 (Moderate) 2 (Severe)	8 (Moderate) 2 (Severe)	14 (Moderate) 2 (Severe)
			Rare, Threatened & Endangered Species Habitat	Area of Potential Habitat – <i>Acres</i>	0	0	0	0
Improve Transit System Connectivity	Effectiveness	Mobility and Operating Efficiencies	Intermodal Connections	Connection to Existing Metro, MARC or Light Rail – <i>Yes/No/Not Applicable (N/A)</i>	N/A	N/A	N/A	N/A
				Existing Bus Routes along Alignment	1	1	2	2
				Buses on Bus Routes along Alignment- <i># per day</i>	140	140	264	264
				Existing Bus Routes Intersected	3	3	2	3
				Buses on Intersecting Bus Routes - <i># per day</i>	304	304	180	304
				Estimated Transit Travel Time - <i>minutes</i>	9.7	10.3	12.8	14.7
				Potential Location along the Alignment for a Major Park & Ride – <i>Yes/No</i>	No	No	Yes	Yes
				Existing Pedestrian Level of Service (LOS) along Alignment	B	B	B	B
				Existing Bicycle LOS along Alignment	D-E	D-E	D-E	D-E
				Access to Existing/Planned Bicycle Trails along Alignment – <i>Yes/No</i>	Yes	Yes	No	Yes
Improve Mobility, Efficiency and Accessibility			Transit Dependency	2000 Zero-Car Households within ¼-mile of Alignment	3,287	3,406	2,971	4,599
				2000 Households within ¼-mile of Alignment	12,003	12,547	11,565	16,896
				2000 Senior Citizens within ¼-mile of Alignment	2,711	2,865	2,566	4,315
				2000 School-Aged Children within ¼-mile of Alignment	1,570	1,594	1,186	2,400

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives			
					Eastern Avenue	Eastern/Fleet	Eastern/Boston	Eastern/Boston/Conkling Loop
					1.3 Miles	1.3 Miles	2.0 Miles	3.7 Miles
Improve Mobility, Efficiency and Accessibility	Effectiveness	Mobility and Operating Efficiencies	Traffic Characteristics	Intersections (signalized and unsignalized) along Alignment	32	62	31	67
				Signalized Intersections along Alignment	11	18	13	27
				Major Intersections along Alignment	2	4	4	6
				Average Daily Traffic along Alignment – <i>Vehicles per day</i>	9,000-18,000	9,000-18,000/ 6,000-16,000	9,000-13,000/ 13,000-23,000	9,000-18,000/ 13,000-23,000/ 6,000
				Travel Lanes in Peak Direction	1	1	1-2	1-2
				Existing Minimum Curb-to-Curb Width along Alignment – <i>Feet</i>	40	40	40	32
				Existing Minimum Right-of-Way Width along Alignment – <i>Feet</i>	64	64	64	60
				On-Street Parking – <i>Yes or No, length of parking eastbound (EB), length of parking westbound (WB)</i>	Yes EB = 1.2 mi. WB = 1.2 mi	Yes EB = 2.4 mi. WB = 2.4 mi	Yes EB = 0.6 mi. WB = 0.6 mi.	Yes EB, SB = 1.7 mi. WB, NB = 1.7 mi.



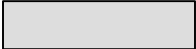
Evaluation Measure with Benefit

The following table highlights the evaluation measures only for which it was determined there was appreciable difference among alternatives. For these measures, the shaded cells indicate those with appreciable benefit compared with the other alternatives.

Table 18: Summary of Evaluation Criteria and Measures with Appreciable Benefit, Central Avenue to Eastern Terminus (BRT)

Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives			
		Eastern Avenue	Eastern/Fleet	Eastern/Boston	Eastern/Boston/Conkling Loop
		1.3 Miles	1.3 Miles	2.0 Miles	3.7 Miles
Capital Costs	Preliminary Estimate - <i>millions</i>	\$25-\$32	\$31-\$40	\$39-\$50	\$49-\$63
Population Served	2000 Population within ¼-mile of Alignment	20,252	21,044	18,725	29,661
	2025 Population within ¼-mile of Alignment	24,840	25,811	21,383	36,434
Employment Served	2000 People Living within ¼-mile of Alignment Who Are Employed	9,914	10,388	9,701	14,127
	2025 People Living within ¼-mile of Alignment Who Are Employed	12,160	12,741	11,078	17,353
	2000 Jobs within ¼-mile of Alignment	6,333	7,444	7,552	10,026
Neighborhood Structure	Activity Centers within ¼-mile of Alignment	18	19	18	27
Development Opportunity	Approved development - <i>Square footage or number of units of new office and retail, number of new residential units within ¼-mile of alignment</i>	Inner Harbor East (2.4 M SF Office, 575,000 SF retail, 1,019 DU); Bohagers Site/Fells Point (40 condos, 325 apts); Bond Street Wharf (100 apts); Aliceanna Project (284 apts, 13,000 SF retail); Union Wharf (350 DU)			
		-		Canton; Canton Crossing	
Parklands	Number of Potentially Impacted Urban Lots	0	0	1-edge	1-edge
	Number of Potentially Impacted Passive Parks	0	0	3-edge	3-edge
	Number of Potentially Impacted Play Lots	0	0	1-edge	1-edge
	Number of Potentially Impacted Regional Parks	1-edge	1-edge	0	1-edge
	Number of Potentially Impacted Open Spaces	0	0	1-proximity	1-proximity
Hazardous Material Sites	Potential Sites (Potential Risk)	4 (Moderate) 0 (Severe)	8 (Moderate) 2 (Severe)	8 (Moderate) 2 (Severe)	14 (Moderate) 2 (Severe)
Intermodal Connections	Estimated Transit Travel Time - <i>minutes</i>	9.7	10.3	12.8	14.7
	Potential Location along the Alignment for a Major Park & Ride	No	No	Yes	Yes
	Access to Existing/Planned Bicycle Trails along Alignment	Yes	Yes	No	Yes

Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT Alternatives			
		Eastern Avenue	Eastern/Fleet	Eastern/Boston	Eastern/Boston/Conkling Loop
		1.3 Miles	1.3 Miles	2.0 Miles	3.7 Miles
Transit Dependency	2000 Zero-Car Households within ¼-mile of Alignment	3,287	3,406	2,971	4,599
	2000 Households within ¼-mile of Alignment	12,003	12,547	11,565	16,896
	2000 Senior Citizens within ¼-mile of Alignment	2,711	2,865	2,566	4,315
	2000 School-Aged Children within ¼-mile of Alignment	1,570	1,594	1,186	2,400
Traffic Characteristics	Existing Minimum Curb-to-Curb Width along Alignment – <i>Feet</i>	40	40	40	32

 Evaluation Measure with Benefit

For each of the evaluation criteria listed above, the following conclusions are made in the comparison of alternatives:

Capital Costs

- On average, the Eastern Avenue and Eastern/Fleet Alternatives are estimated to have approximately \$15-\$25 million less in capital cost than the other alternatives.

Population Served

2000 and 2025 Population within ¼-mile of Alignment

- In 2000 approximately 10,000 more people resided within ¼-mile of the Eastern/Boston/Conkling Loop than near the other alternatives. By 2025, this difference is projected to increase to 11,000 to 15,000 more people.

Employment Served

2000 and 2025 People Living within ¼-mile of Alignment Who Are Employed

- In 2000 approximately 4,000 more people who are employed lived near the Eastern/Boston/Conkling Loop Alternative. By 2025, it is projected that between 4,000 and 6,000 people who are employed are projected to live near the Eastern/Boston/Conkling Loop Alternative.

2000 Jobs within ¼-mile of Alignment

- There are at least 2,500 more jobs near the Eastern/Boston/Conkling Loop Alternative than the other alternatives.

Neighborhood Structure

Activity Centers within 1/4-mile of Alignment

- There are more activity centers near the Eastern/Boston/Conkling Loop Alternative. Although comparable in numbers to the other alternatives and like the Eastern/Boston/Conkling Loop Alternative, the Eastern/Boston Alternative is near Canton Crossing and Canton, two large activity centers.

Parklands

Number of Potentially Impacted Urban Lots, Passive Parks, Play Lots and Open Spaces

- In contrast to the other alternatives, the Eastern Avenue and Eastern/Fleet Alternatives would not potentially impact any urban lots, passive parks, play lots or open spaces.

Number of Potentially Impacted Regional Parks

- The Eastern/Boston Alternative would not potentially impact Patterson Park, a regional park.

Hazardous Material Sites

Potential Sites and Risk

- The Eastern Avenue Alternative has fewer potential hazardous material sites and associated risk than do the other alternatives.

Intermodal Connections

Estimated Transit Travel Time

- The Eastern Avenue and Eastern/Fleet Alternatives would have an estimated transit travel time of two to five more minutes faster than the other alternatives.

Potential Location along the Alignment for a Major Park & Ride

- Both the Eastern/Boston and Eastern/Boston/Conkling Loop Alternatives would have a potential location near Canton Crossing for a major park & ride.

Access to Existing/Planned Bicycle Trails along Alignment

- Only the Eastern/Boston Alternative would not have access to either existing or planned bicycle trails.

Transit Dependency

2000 Zero-Car Households, Households, Senior Citizens and School-Aged Children within 1/4-mile of Alignment

- As with population and employment served, more households (including those without a car), senior citizens and school-aged children reside near the Eastern/Boston/Conkling Loop Alternative.

Traffic Characteristics

Existing Minimum Curb-to-Curb Width

- Conkling Street has a narrower roadway than do the streets for the other alternatives. This offers less opportunity to construct a transitway within the roadway.

RECOMMENDATION

Based on the above evaluation, it is recommended that all of the BRT alternatives from Central Avenue to the Eastern Terminus that are described above be carried forward for further study.

The rationale for this recommendation is that the alternatives have a mixture of positive attributes. The most appreciable differences among alternatives include:

- Capital costs -- The Eastern Avenue and Eastern/Fleet Alternatives have the lowest estimated cost.
- Population served -- More people live and are projected to live near the Eastern/Boston/Conkling Loop Alternative.
- Activity Centers -- More are near the Eastern/Boston and Eastern/Boston/Conkling Loop Alternatives.
- Transit dependency -- More potentially transit-dependent segments of the population live near the Eastern/Boston/Conkling Loop Alternative.
- Estimated transit travel time -- The Eastern Avenue and Eastern/Fleet Alternatives would have the fastest transit travel time.
- Potential Location along the Alignment for a Major Park & Ride -- Only the Eastern/Boston and Eastern/Boston/Conkling Loop Alternatives would have a potential location.

The following illustrates the alignment for the alternatives recommended for further study.

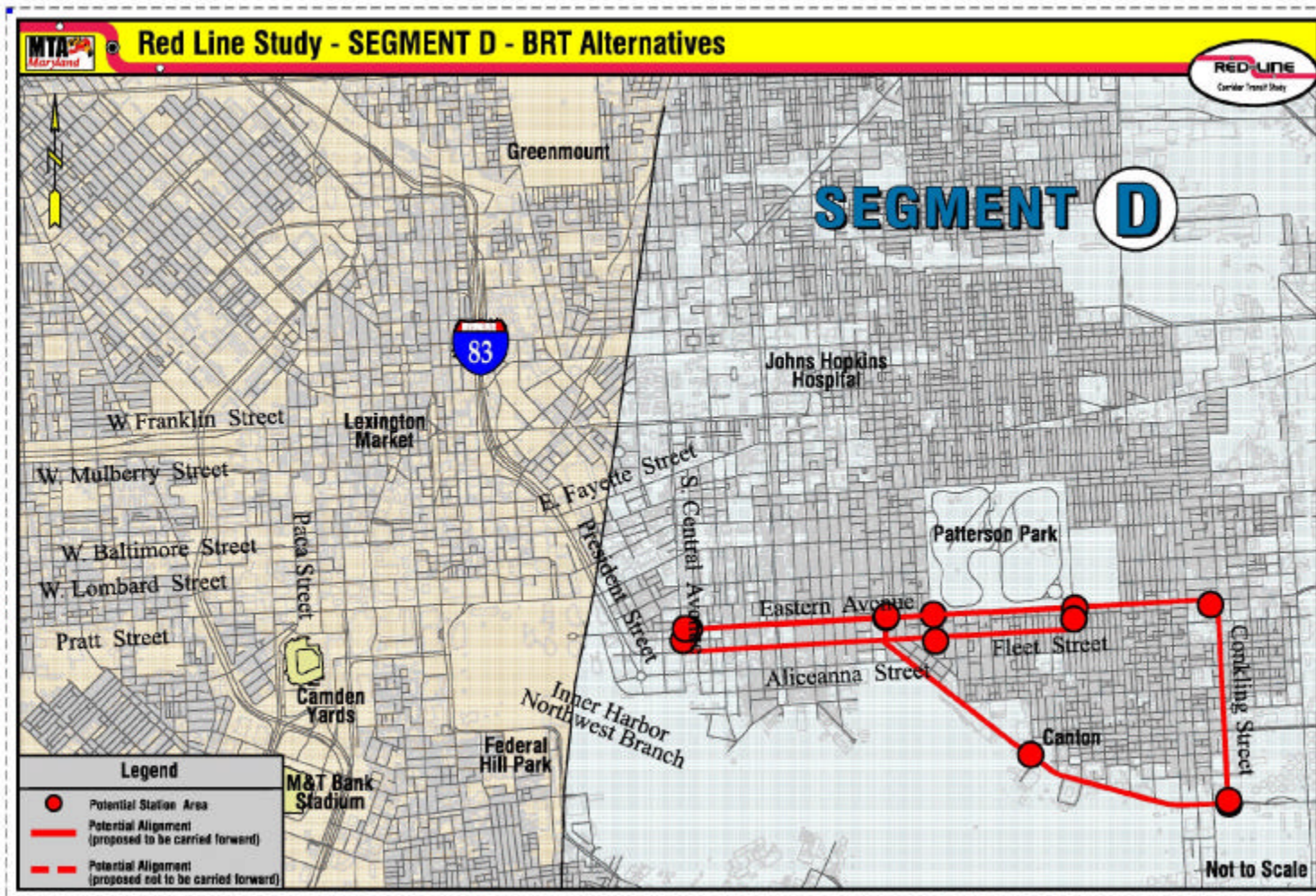


Figure 40: Central Avenue to Eastern Terminus BRT Alternatives Recommended for Further Study

OPTIONS NOT CARRIED FORWARD FOR FURTHER STUDY

The following are options to the alternatives evaluated above. These options were not evaluated in the same level of detail and are recommended for no further study as described below.

South Broadway Avenue – from Eastern Avenue to Fleet Street

This option was eliminated because the best operational scenario would have a continuous east-west movement with a minimal number of turns.

OTHER OPTIONS FOR FURTHER STUDY

The following options were not evaluated in detail and are recommended for further study.

Aliceanna Street – from Harbor Magic Way to Boston Street

This option would be in conjunction with Fleet Street as part of a one-way pair and would be an option to the Eastern Avenue/Fleet Street Alternative evaluated in detail above.

Clinton Street – from Eastern Avenue to Boston Street

Another option for Eastern/Boston/Conkling Loop Alternative to reach Eastern Avenue from Boston Street is via Clinton Street instead of Conkling Street.

SEGMENT D: Central Avenue at Eastern Avenue to Eastern Terminus **LRT Alternatives**

DESCRIPTION OF LRT ALTERNATIVES

The following description summarizes the four LRT alternatives evaluated in the screening of preliminary alternatives for this segment. While variations of the following alternatives have been considered, each of the following was determined to be most representative of the respective alternative within this segment. In further study of the alternatives that are retained, design options will continue to be explored and evaluated as described at the end of this section.

Eastern Avenue Alternative

The western terminus of this alternative would begin at the intersection of South Central Avenue and Eastern Avenue. The alignment would continue east and at-grade along Eastern Avenue to Linwood Avenue.

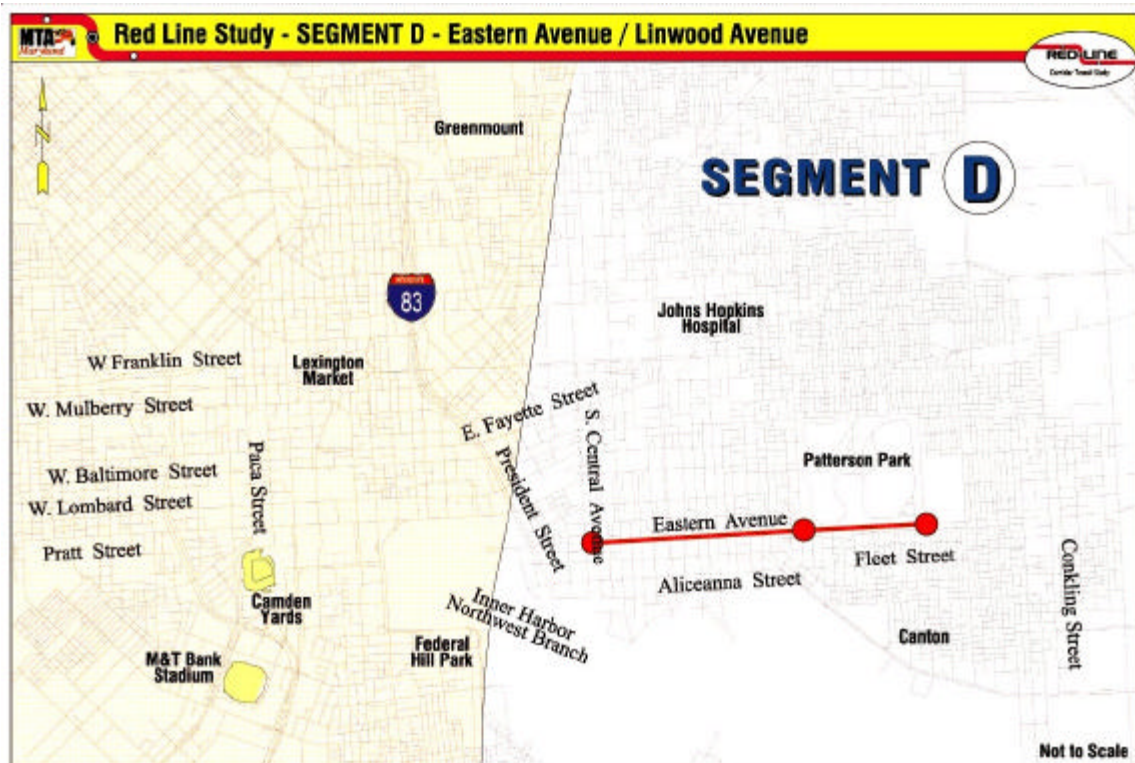


Figure 41: Eastern Avenue from Central Avenue to Eastern Terminus (LRT)

Eastern Avenue/Fleet Street Alternative

The western terminus of this alternative would begin at the intersection of South Central Avenue and Eastern Avenue. The transitway would be separated into one-way pairs. The eastbound transitway would follow Fleet Street at-grade to Linwood Avenue. The westbound transitway would follow Eastern Avenue at-grade from Linwood Avenue to South Central Avenue.

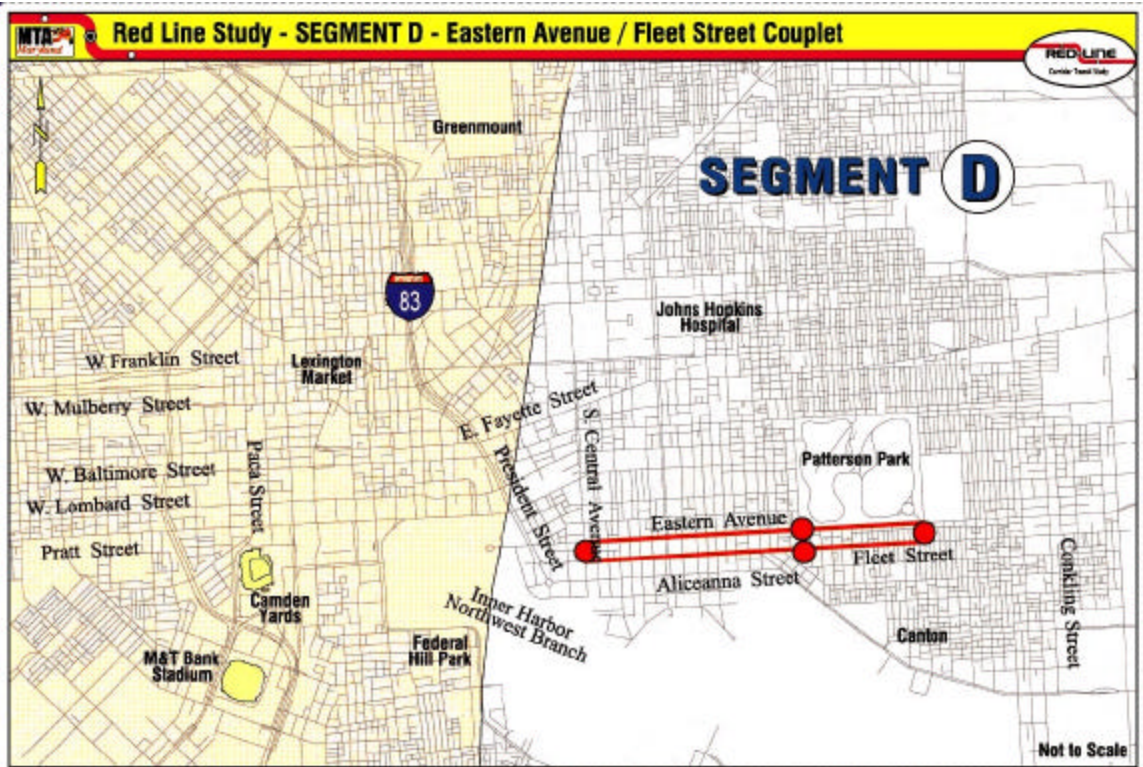


Figure 42: Eastern Avenue/Fleet Street Alternative from Central Avenue to Eastern Terminus (LRT)

Eastern Avenue/Boston Street Alternative

The western terminus of this alternative would begin at the intersection of South Central Avenue and Eastern Avenue. The alignment would proceed east and at-grade along Eastern Avenue to Chester Street. At Chester Street the alignment would turn south and continue at-grade to Boston Street. At Boston Street the alignment would turn southeast and follow Boston Street at-grade to the eastern terminus at Conkling Street.

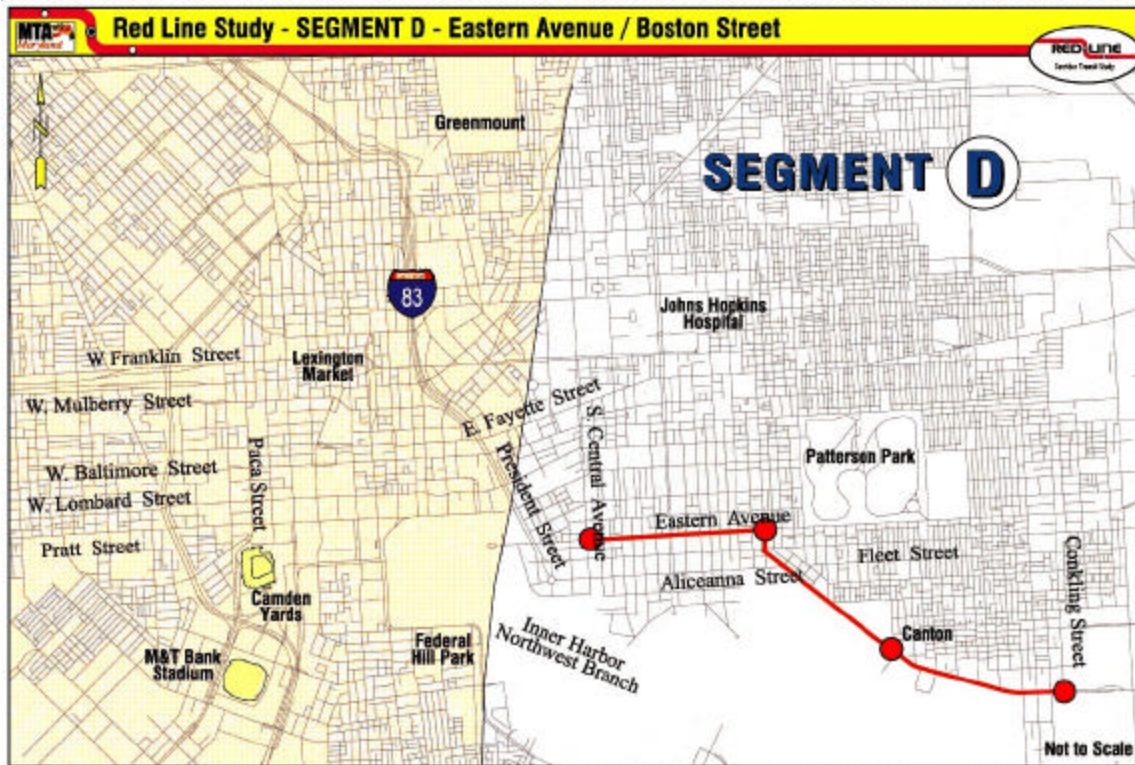


Figure 43: Eastern Avenue/Boston Street Alternative from Central Avenue to Eastern Terminus (LRT)

Eastern/Boston/Conkling Loop Alternative

The western terminus of this alternative would begin at the intersection of South Central Avenue and Eastern Avenue. The alignment would proceed east, two-way and at-grade along Eastern Avenue to Chester Street. At Chester Street, the alternative would proceed as a one-way loop. Only the eastbound transitway would turn south onto Chester Street to Boston Street. The alignment would continue one-way and at-grade along Boston Street to Conkling Street. At Conkling Street, the one-way transitway would turn north and continue along Conkling Street to Eastern Avenue. At Eastern Avenue, the alternative would turn west to Chester Street to then begin two-way operation west of Chester Street.

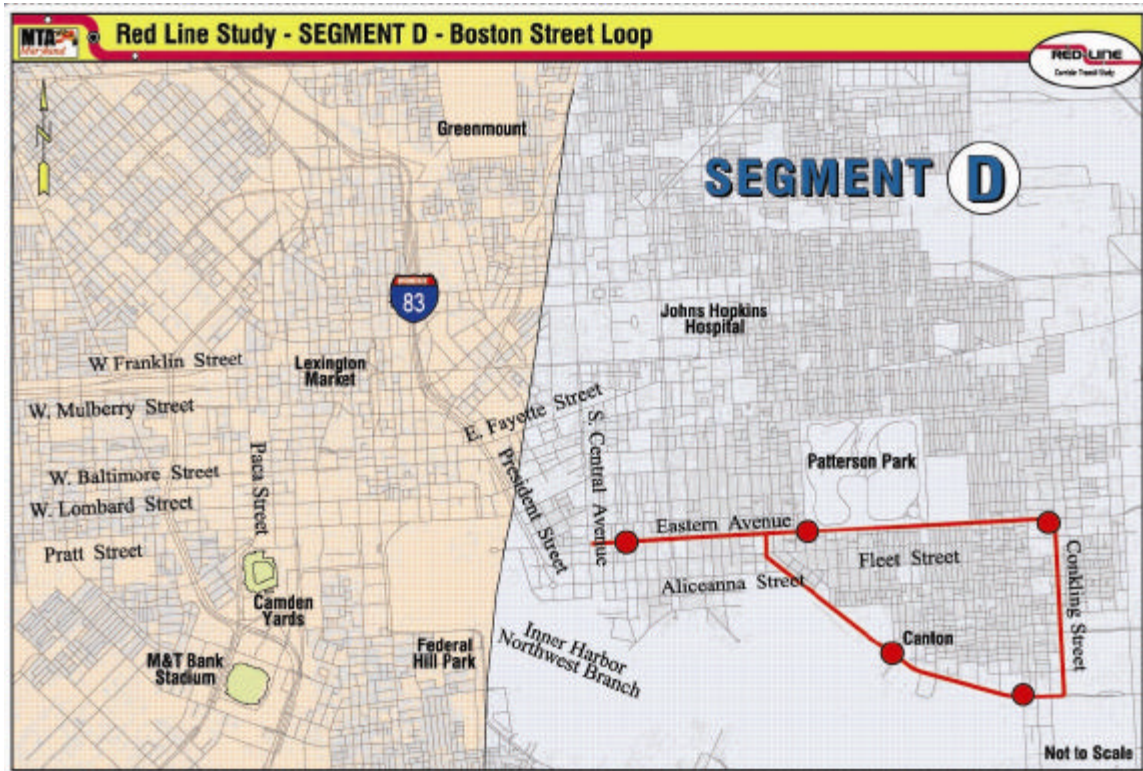


Figure 44: Eastern/Boston/Conkling Loop Alternative from Central Avenue to Eastern Terminus (LRT)

EVALUATION OF ALTERNATIVES

Evaluation measures have been selected to reflect the various advantages and disadvantages of each alternative. These evaluation measures are being used for screening all preliminary alternatives for the entire Red Line corridor. The measures are also consistent with criteria prescribed in the FTA Project Justification Rating and Evaluation categories (*i.e.*, New Starts) as well as the Red Line Corridor project goals stated in the Purpose and Need. Definitions for the measures are included in the Appendix.

The following table summarizes the data for the LRT alternatives described above. Those measures that have been determined to have appreciable benefits when compared with other alternatives are shaded.

Table 19: Screening of Preliminary Alternatives, Central Avenue to Eastern Terminus (LRT)

(Note: Shaded cells indicate measure with appreciable benefit.)

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives			
					Eastern Avenue	Eastern/ Fleet	Eastern/ Boston	Eastern/ Boston/ Conkling Loop
					1.3 Miles	1.3 Miles	2.0 Miles	3.7 Miles
Cost Effectiveness			Engineering Issues	Meets Design Criteria – <i>Yes or description of how criteria not met</i>	Yes	Max. Grade > 4%	Max. Grade > 4%	Max. Grade > 4%
			Capital Costs	Preliminary Estimate - <i>millions</i>	\$50-\$63	\$81-\$97	\$79-\$100	\$120-\$143
Support Community Revitalization and Economic Development	Impacts and Equity	Transit- Supportive Land Use	Population Served	2000 Population within ¼-mile of Alignment	20,252	21,044	18,725	29,661
				2025 Population within ¼-mile of Alignment	24,840	25,811	21,383	36,434
			Access to Transit	% of Minority Population within ¼-mile of Alignment	21.6%	20.9%	19.5%	18.6%
				% of Low-Income Population within ¼- mile of Alignment	20.2%	19.8%	19.6%	20.1%
			Employment Served	2000 People Living within ¼-mile of Alignment Who Are Employed	9,914	10,388	9,701	14,127
				2025 People Living within ¼-mile of Alignment Who Are Employed	12,160	12,741	11,078	17,353
				2000 Jobs within ¼-mile of Alignment	6,333	7,444	7,552	10,026
			Neighborhood Structure	Activity Centers within ¼-mile of Alignment (Neighborhood Shopping Center (and larger), Entertainment District/Tourist Attractions, and Institutions (schools, hospitals, etc.))	18	19	18	27
				Significant Barrier to Walkability/Access - <i>Yes/No</i>	No	No	No	No
				Potential for Stations (<i>i.e.</i> , Quantity and Quality of Access) - <i>Low/Medium/High</i>	Medium	Medium	Medium	Medium
				Housing Density within a ¼-mile of Alignment – <i>Average # of Dwelling Units per Acre</i>	17.5	17.6	14.7	15.4

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives			
					Eastern Avenue	Eastern/ Fleet	Eastern/ Boston	Eastern/ Boston/ Conkling Loop
					1.3 Miles	1.3 Miles	2.0 Miles	3.7 Miles
Support Community Revitalization and Economic Development	Impacts and Equity	Transit-Supportive Land Use	Development Opportunity	Presence of Empowerment Zones/Enterprise Zones/SNAPs/Revitalization Districts within a ¼ mile of Alignment – <i>Yes/No</i>	Yes	Yes	Yes	Yes
				Potential for Development within a ¼-mile of Alignment – <i>Low/Medium/High</i>	High	High	High	High
			Transit-Oriented Development (TOD) Opportunity	Approved development - <i>Square footage or number of units of new office and retail, number of new residential units within ¼-mile of alignment</i>	Inner Harbor East (2.4 M SF Office, 575,000 SF retail, 1,019 DU); Bohagers Site/Fells Point (40 condos, 325 apts); Bond Street Wharf (100 apts); Aliceanna Project (284 apts, 13,000 SF retail); Union Wharf (350 DU)			
				-	Canton; Canton Crossing			
		Transit-Oriented Development (TOD) Opportunity	Potential Sites for TOD and Renaissance Opportunities	0	0	1	1	
Environmental Stewardship		Environmental Benefits	Cultural Resources	Historic Districts within Area of Potential Effect (APE) (w/ elevated sensitivity)	7 (1)	7 (1)	5 (1)	7 (1)
				Individual Historic Properties within APE (w/ elevated sensitivity)	4 (1)	4 (1)	4 (1)	4 (1)
				Known Archeological Resources within APE	0	2	1	1
			Parklands	Number of Potentially Impacted Urban Lots	0	0	1-edge	1-edge
				Number of Potentially Impacted Passive Parks	0	0	3-edge	3-edge
				Number of Potentially Impacted Play Lots	0	0	1-edge	1-edge
				Number of Potentially Impacted Regional Parks	1-edge	1-edge	0	1-edge
				Number of Potentially Impacted Open Spaces	0	0	1-proximity	1-proximity
			Noise	Potential for Impact to Receptors along Alignment (houses, churches, hospitals, parks, etc.) – <i>Low/Medium/High</i>	Low	Low	Low	Low
			Wetlands	Type (Potential for Impacts)	None	None	None	None
	Streams		Crossings	0	0	0	0	
	Forests		Crossing(s) - <i>Linear Feet</i>	0	0	0	0	

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives			
					Eastern Avenue	Eastern/ Fleet	Eastern/ Boston	Eastern/ Boston/ Conkling Loop
					1.3 Miles	1.3 Miles	2.0 Miles	3.7 Miles
Environmental Stewardship	Impacts and Equity	Environmental Benefits	100-Year Floodplains	Crossing(s) - <i>Linear Feet</i>	300	300	300	300
			Hazardous Material Sites	Potential Sites (Potential Risk)	4 (Moderate) 0 (Severe)	8 (Moderate) 2 (Severe)	8 (Moderate) 2 (Severe)	14 (Moderate) 2 (Severe)
			Rare, Threatened & Endangered Species Habitat	Area of Potential Habitat – <i>Acres</i>	0	0	0	0
Improve Transit System Connectivity	Effectiveness	Mobility and Operating Efficiencies	Intermodal Connections	Connection to Existing Metro, MARC or Light Rail – <i>Yes/No/Not Applicable (N/A)</i>	N/A	N/A	N/A	N/A
				Existing Bus Routes along Alignment	1	1	2	2
				Buses on Bus Routes along Alignment- <i># per day</i>	140	140	264	264
				Existing Bus Routes Intersected	3	3	2	3
				Buses on Intersecting Bus Routes - <i># per day</i>	304	304	180	304
				Estimated Transit Travel Time - <i>minutes</i>	9.7	10.3	12.8	14.7
				Potential Location along the Alignment for a Major Park & Ride – <i>Yes/No</i>	No	No	Yes	Yes
				Existing Pedestrian Level of Service (LOS) along Alignment	B	B	B	B
				Existing Bicycle LOS along Alignment	D-E	D-E	D-E	D-E
				Access to Existing/Planned Bicycle Trails along Alignment – <i>Yes/No</i>	Yes	Yes	No	Yes
Improve Mobility, Efficiency and Accessibility			Transit Dependency	2000 Zero-Car Households within ¼-mile of Alignment	3,287	3,406	2,971	4,599
				2000 Households within ¼-mile of Alignment	12,003	12,547	11,565	16,896
				2000 Senior Citizens within ¼-mile of Alignment	2,711	2,865	2,566	4,315
				2000 School-Aged Children within ¼-mile of Alignment	1,570	1,594	1,186	2,400

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives			
					Eastern Avenue	Eastern/ Fleet	Eastern/ Boston	Eastern/ Boston/ Conkling Loop
					1.3 Miles	1.3 Miles	2.0 Miles	3.7 Miles
Improve Mobility, Efficiency and Accessibility	Effectiveness	Mobility and Operating Efficiencies	Traffic Characteristics	Intersections (signalized and unsignalized) along Alignment	32	62	31	67
				Signalized Intersections along Alignment	11	18	13	27
				Major Intersections along Alignment	2	4	4	6
				Average Daily Traffic along Alignment – <i>Vehicles per day</i>	9,000-18,000	9,000-18,000/ 6,000-16,000	9,000-13,000/ 13,000-23,000	9,000-18,000/ 13,000-23,000/ 6,000
				Travel Lanes in Peak Direction	1	1	1-2	1-2
				Existing Minimum Curb-to-Curb Width along Alignment – <i>Feet</i>	40	40	40	32
				Existing Minimum Right-of-Way Width along Alignment – <i>Feet</i>	64	64	64	60
				On-Street Parking – <i>Yes or No, length of parking eastbound (EB), length of parking westbound (WB)</i>	Yes EB = 1.2 mi. WB = 1.2 mi	Yes EB = 2.4 mi. WB = 2.4 mi	Yes EB = 0.6 mi. WB = 0.6 mi.	Yes EB, SB = 1.7 mi. WB, NB = 1.7 mi.



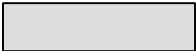
Evaluation Measure with Benefit

The following table highlights the evaluation measures only for which it was determined there was appreciable difference among alternatives. For these measures, the shaded cells indicate those with appreciable benefit compared with the other alternatives.

Table 20: Summary of Evaluation Criteria and Measures with Appreciable Benefit, Central Avenue to Eastern Terminus (LRT)

Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives			
		Eastern Avenue	Eastern/Fleet	Eastern/Boston	Eastern/Boston/Conkling Loop
		1.3 Miles	1.3 Miles	2.0 Miles	3.7 Miles
Capital Costs	Preliminary Estimate - <i>millions</i>	\$50-\$63	\$81-\$97	\$79-\$100	\$120-\$143
Population Served	2000 Population within ¼-mile of Alignment	20,252	21,044	18,725	29,661
	2025 Population within ¼-mile of Alignment	24,840	25,811	21,383	36,434
Employment Served	2000 People Living within ¼-mile of Alignment Who Are Employed	9,914	10,388	9,701	14,127
	2025 People Living within ¼-mile of Alignment Who Are Employed	12,160	12,741	11,078	17,353
	2000 Jobs within ¼-mile of Alignment	6,333	7,444	7,552	10,026
Neighborhood Structure	Activity Centers within ¼-mile of Alignment	18	19	18	27
Development Opportunity	Approved development - <i>Square footage or number of units of new office and retail, number of new residential units within ¼-mile of alignment</i>	Inner Harbor East (2.4 M SF Office, 575,000 SF retail, 1,019 DU); Bohagers Site/Fells Point (40 condos, 325 apts); Bond Street Wharf (100 apts); Aliceanna Project (284 apts, 13,000 SF retail); Union Wharf (350 DU)			
		-		Canton; Canton Crossing	
Parklands	Number of Potentially Impacted Urban Lots	0	0	1-edge	1-edge
	Number of Potentially Impacted Passive Parks	0	0	3-edge	3-edge
	Number of Potentially Impacted Play Lots	0	0	1-edge	1-edge
	Number of Potentially Impacted Regional Parks	1-edge	1-edge	0	1-edge
	Number of Potentially Impacted Open Spaces	0	0	1-proximity	1-proximity
Hazardous Material Sites	Potential Sites (Potential Risk)	4 (Moderate) 0 (Severe)	8 (Moderate) 2 (Severe)	8 (Moderate) 2 (Severe)	14 (Moderate) 2 (Severe)
Intermodal Connections	Estimated Transit Travel Time - <i>minutes</i>	9.7	10.3	12.8	14.7
	Potential Location along the Alignment for a Major Park & Ride	No	No	Yes	Yes
	Access to Existing/Planned Bicycle Trails along Alignment	Yes	Yes	No	Yes

Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	LRT Alternatives			
		Eastern Avenue	Eastern/Fleet	Eastern/Boston	Eastern/Boston/Conkling Loop
		1.3 Miles	1.3 Miles	2.0 Miles	3.7 Miles
Transit Dependency	2000 Zero-Car Households within ¼-mile of Alignment	3,287	3,406	2,971	4,599
	2000 Households within ¼-mile of Alignment	12,003	12,547	11,565	16,896
	2000 Senior Citizens within ¼-mile of Alignment	2,711	2,865	2,566	4,315
	2000 School-Aged Children within ¼-mile of Alignment	1,570	1,594	1,186	2,400
Traffic Characteristics	Existing Minimum Curb-to-Curb Width along Alignment – <i>Feet</i>	40	40	40	32

 Evaluation Measure with Benefit

For each of the evaluation criteria listed above, the following conclusions are made in the comparison of alternatives:

Capital Costs

- The Eastern Avenue Alternative is estimated to have approximately \$20-\$90 million less in capital cost than the other alternatives.

Population Served

2000 and 2025 Population within ¼-mile of Alignment

- In 2000 approximately 10,000 more people resided within ¼-mile of the Eastern/Boston/Conkling Loop than near the other alternatives. By 2025, this difference is projected to increase to 11,000 to 15,000 more people.

Employment Served

2000 and 2025 People Living within ¼-mile of Alignment Who Are Employed

- In 2000 approximately 4,000 more people who are employed lived near the Eastern/Boston/Conkling Loop Alternative. By 2025, it is projected that between 4,000 and 6,000 people who are employed are projected to live near the Eastern/Boston/Conkling Loop Alternative.

2000 Jobs within ¼-mile of Alignment

- There are at least 2,500 more jobs near the Eastern/Boston/Conkling Loop Alternative than the other alternatives.

Neighborhood Structure

Activity Centers within ¼-mile of Alignment

- There are more activity centers near the Eastern/Boston/Conkling Loop Alternative. Although comparable in numbers to the other alternatives and

like the Eastern/Boston/Conkling Loop Alternative, the Eastern/Boston Alternative is near Canton Crossing and Canton, two large activity centers.

Parklands

Number of Potentially Impacted Urban Lots, Passive Parks, Play Lots and Open Spaces

- In contrast to the other alternatives, the Eastern Avenue and Eastern/Fleet Alternatives would not potentially impact any urban lots, passive parks, play lots or open spaces.

Number of Potentially Impacted Regional Parks

- The Eastern/Boston Alternative would not potentially impact Patterson Park, a regional park.

Hazardous Material Sites

Potential Sites and Risk

- The Eastern Avenue Alternative has fewer potential hazardous material sites and associated risk than do the other alternatives.

Intermodal Connections

Estimated Transit Travel Time

- The Eastern Avenue and Eastern/Fleet Alternatives would have an estimated transit travel time of two to five more minutes faster than the other alternatives.

Potential Location along the Alignment for a Major Park & Ride

- Both the Eastern/Boston and Eastern/Boston/Conkling Loop Alternatives would have a potential location near Canton Crossing for a major park & ride.

Access to Existing/Planned Bicycle Trails along Alignment

- Only the Eastern/Boston Alternative would not have access to either existing or planned bicycle trails.

Transit Dependency

2000 Zero-Car Households, Households, Senior Citizens and School-Aged Children within 1/4-mile of Alignment

- As with population and employment served, more households (including those without a car), senior citizens and school-aged children reside near the Eastern/Boston/Conkling Loop Alternative.

Traffic Characteristics

Existing Minimum Curb-to-Curb Width

- Conkling Street has a narrower roadway than do the streets for the other alternatives. This offers less opportunity to construct a transitway within the roadway.

RECOMMENDATION

Based on the above evaluation, it is recommended that all of the LRT alternatives from Central Avenue to the Eastern Terminus that are described above be carried forward for further study.

The rationale for this recommendation is that the alternatives have a mixture of positive attributes. The most appreciable differences among alternatives include:

- Capital costs -- The Eastern Avenue and Eastern/Fleet Alternatives have the lowest estimated cost.
- Population served -- More people live and are projected to live near the Eastern/Boston/Conkling Loop Alternative.
- Activity Centers -- More are near the Eastern/Boston and Eastern/Boston/Conkling Loop Alternatives.
- Transit dependency -- More potentially transit-dependent segments of the population live near the Eastern/Boston/Conkling Loop Alternative.
- Estimated transit travel time -- The Eastern Avenue and Eastern/Fleet Alternatives would have the fastest transit travel time.
- Potential Location along the Alignment for a Major Park & Ride -- Only the Eastern/Boston and Eastern/Boston/Conkling Loop Alternatives would have a potential location.

The following illustrates the alignment for the alternatives recommended for further study.

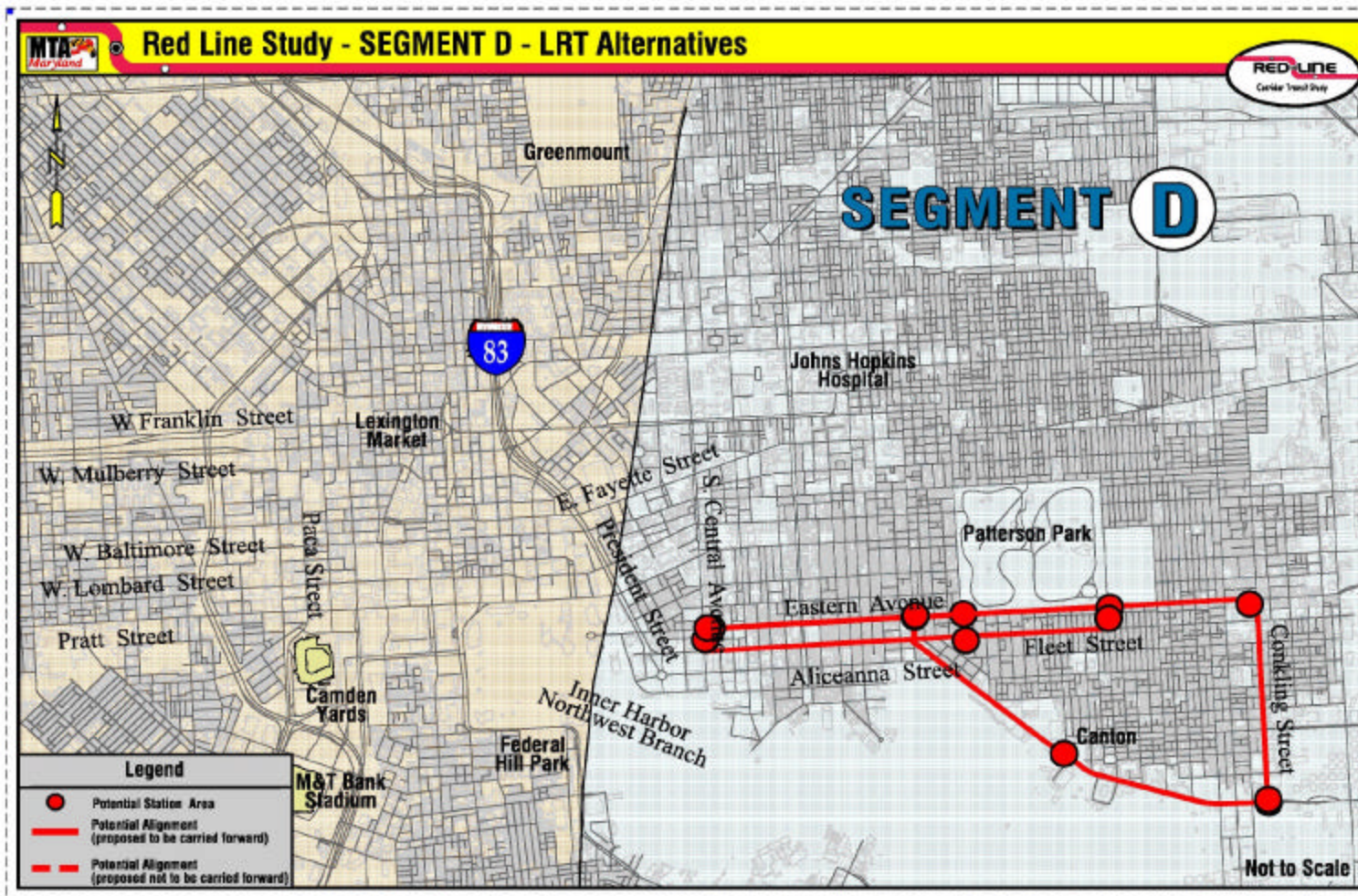


Figure 45: Central Avenue to Eastern Terminus LRT Alternatives Recommended for Further Study

OPTIONS NOT CARRIED FORWARD FOR FURTHER STUDY

The following are options to the alternatives evaluated above. These options were not evaluated in the same level of detail but are recommended for no further study as described below.

South Wolfe and South Washington Street – from Eastern Avenue to Aliceanna Street

These options are recommended for no further study because the best operational scenario would have a continuous east-west movement with a minimal number of turns. This is particularly true for LRT.

OTHER OPTIONS FOR FURTHER STUDY

The following options were not evaluated in detail but are recommended for further study.

Aliceanna Street – from Harbor Magic Way to Boston Street

This option would be in conjunction with Fleet Street as part of a one-way pair and would be an option to the Eastern Avenue/Fleet Street Alternative evaluated in detail above.

Clinton Street – from Eastern Avenue to Boston Street

Another option for Eastern/Boston/Conkling Loop Alternative to reach Eastern Avenue from Boston Street is via Clinton Street instead of Conkling Street.

**SEGMENT C2 Tunnels: US 40 and North Arlington Avenue to Central Avenue
and Eastern Avenue
BRT and LRT Alternatives**

DESCRIPTION OF ALTERNATIVES

The following description summarizes the six tunnel alternatives evaluated in the screening of preliminary alternatives for this segment. While variations of the following alternatives have been considered, each of the following was determined to be most representative of the respective alternative within this segment. In further study of the alternatives that are retained, design options will continue to be explored and evaluated as described at the end of this section.

Saratoga Street Alternative

The western terminus of this alternative would begin east of North Arlington Avenue along the fully controlled access alignment of US 40. The alignment would enter a tunnel and would continue under Saratoga Street, turning south under Saint Paul Street. The alignment would turn east under Fayette Street and continue under Fayette Street to exit the tunnel west of the intersection of Fayette Street and Central Avenue.

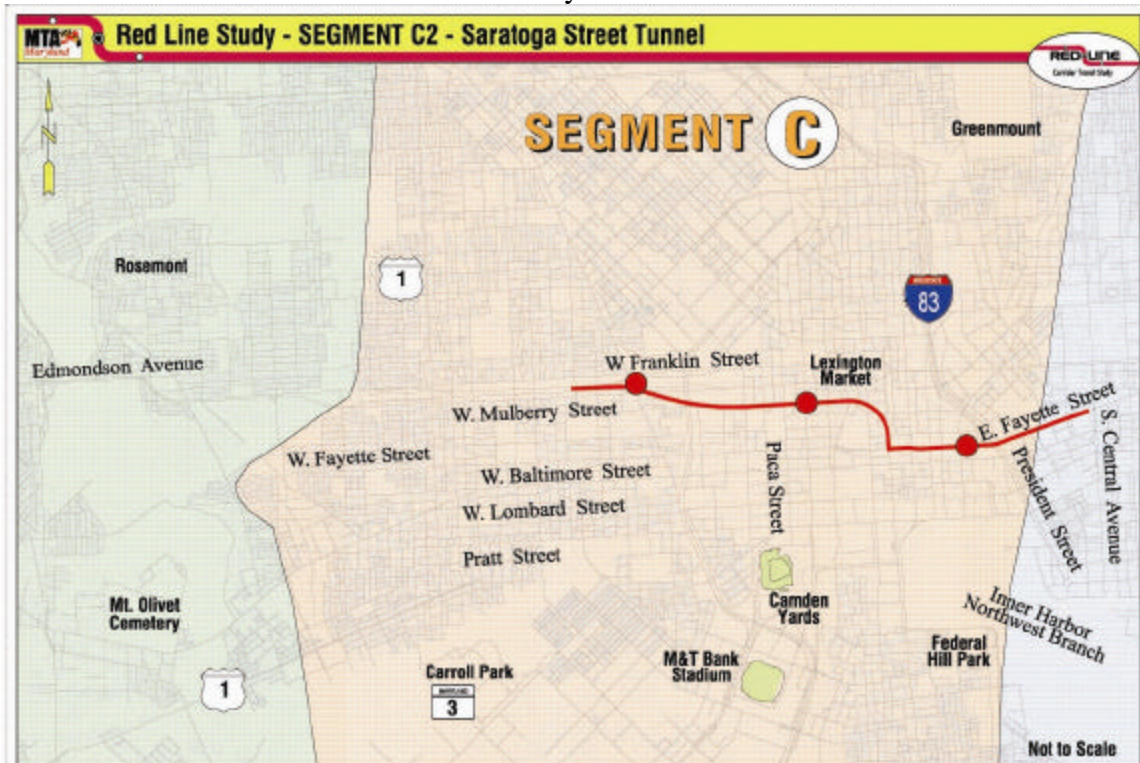


Figure 46: Saratoga Street Tunnel Alternative from US 40 and North Arlington Avenue to Central Avenue and Eastern Avenue (BRT & LRT)

Saratoga/Pratt Alternative

The western terminus of this alternative would begin east of North Arlington Avenue along the fully controlled access alignment of US 40. The alignment would enter a tunnel and would continue under Saratoga Street, turning south under Saint Paul Street. The alignment would turn east under Pratt Street, continue under Pratt Street past President Street and then turn south toward Eastern Avenue. The alignment would follow under Eastern Avenue and would exit the tunnel at the intersection of Eastern Avenue and Central Avenue.

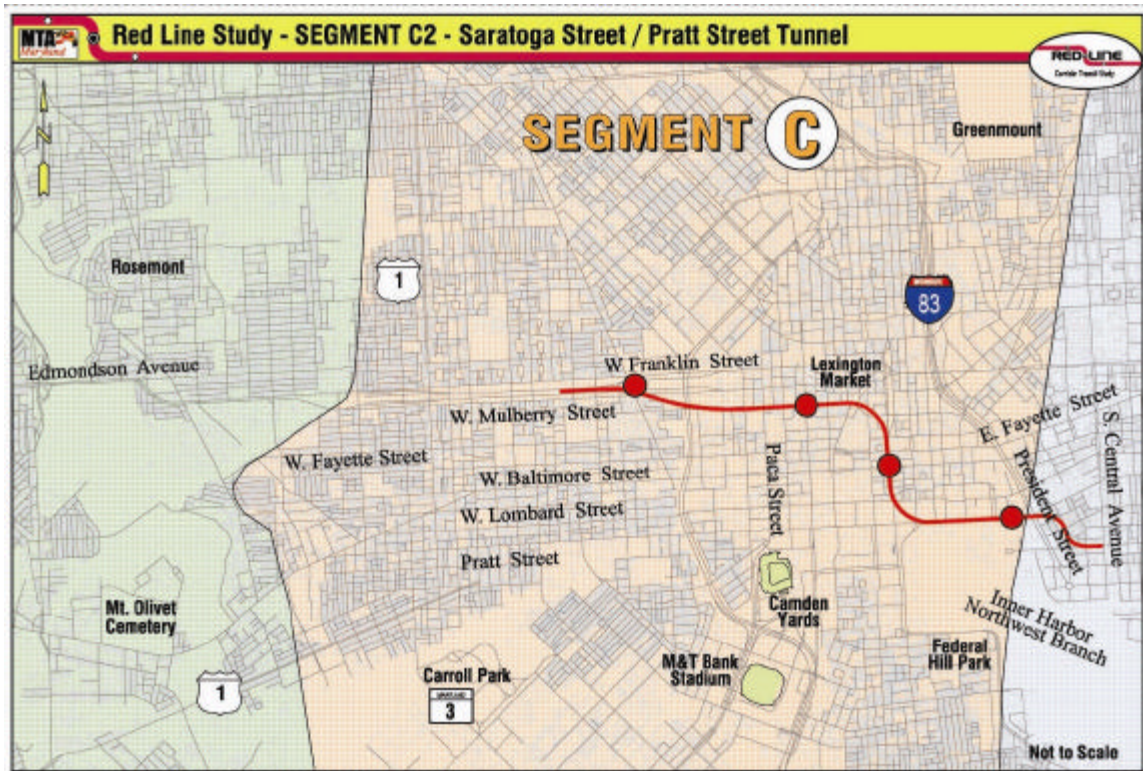


Figure 47: Saratoga/Pratt Tunnel Alternative from US 40 and North Arlington Avenue to Central Avenue and Eastern Avenue (BRT & LRT)

Saratoga/Fayette Alternative

The western terminus of this alternative would begin east of North Arlington Avenue along the fully controlled access alignment of US 40. The alignment would enter a tunnel and would continue under Saratoga Street, turning south under Paca Street. The alignment would turn east under Fayette Street and continue under Fayette Street to exit the tunnel west of the intersection of Fayette Street and Central Avenue.

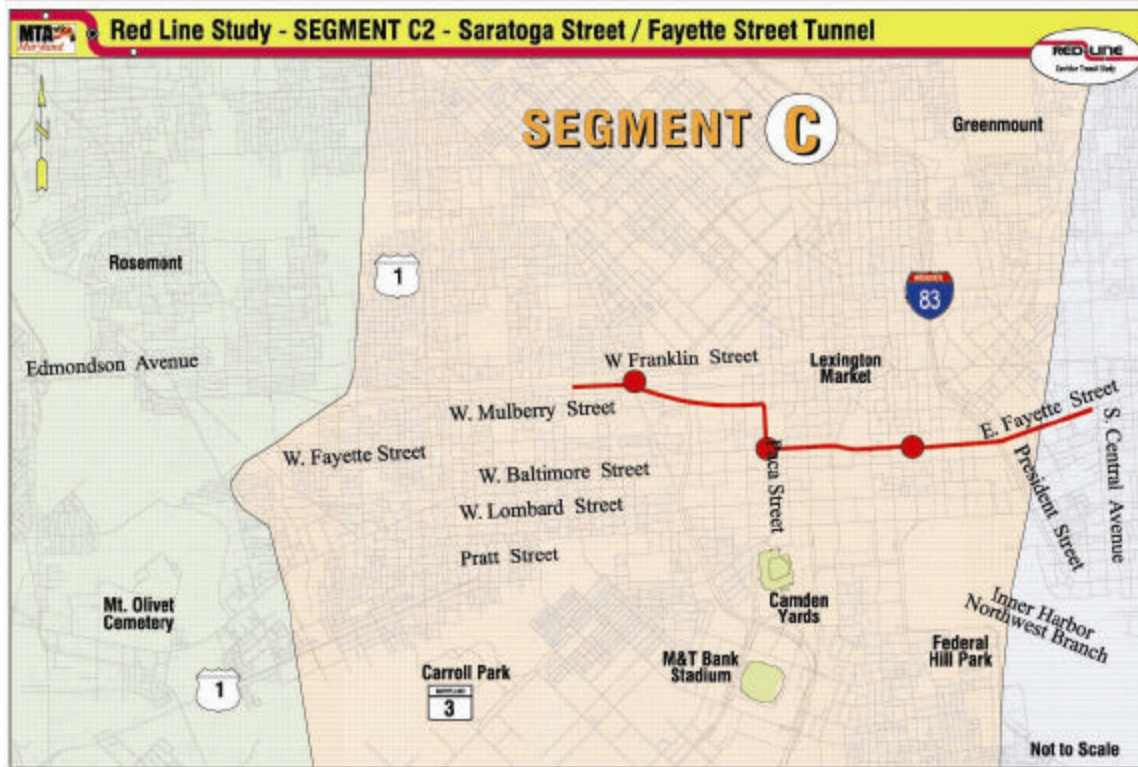


Figure 48: Saratoga/Fayette Tunnel Alternative from US 40 and North Arlington Avenue to Central Avenue and Eastern Avenue (BRT & LRT)

Fayette Street Alternative

The western terminus of this alternative would begin east of North Arlington Avenue along the fully controlled access alignment of US 40. The alignment would enter a tunnel and would continue south under Fremont Street to the intersection of Fayette Street. The alignment would turn east under Fayette Street and continue under Fayette Street to exit the tunnel west of the intersection of Fayette Street and Central Avenue.

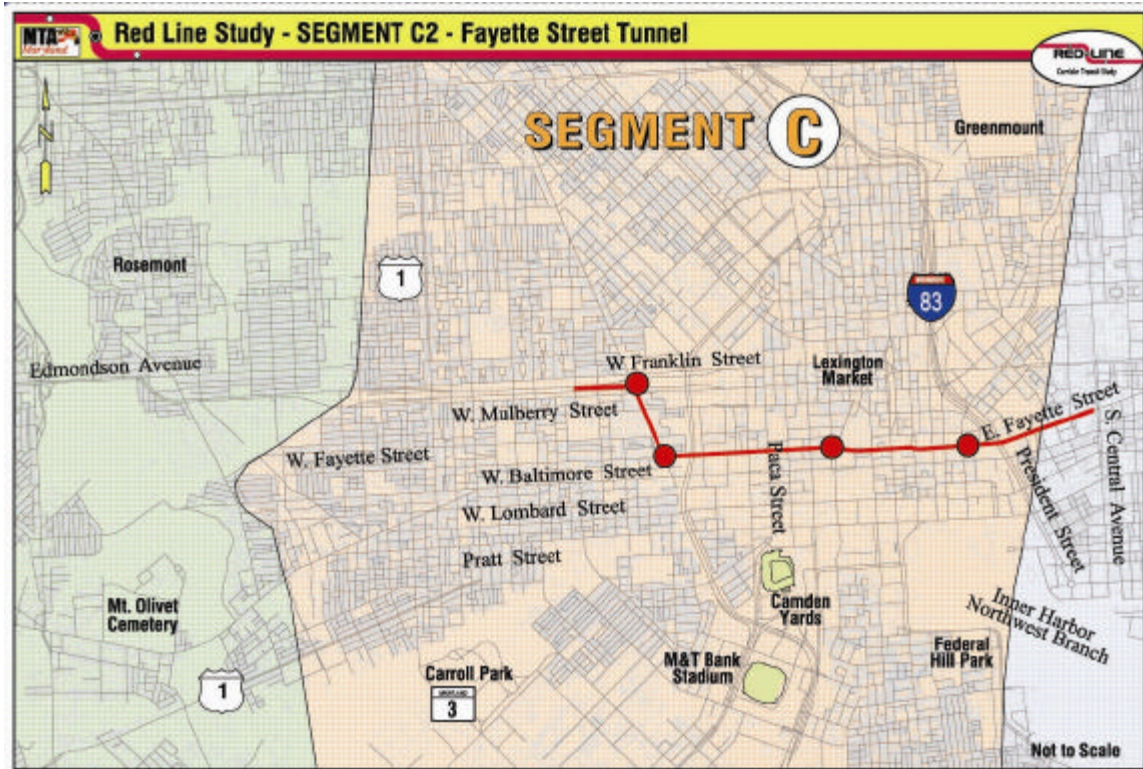


Figure 49: Fayette Street Tunnel Alternative from US 40 and North Arlington Avenue to Central Avenue and Eastern Avenue (BRT & LRT)

Lombard Street Alternative

The western terminus of this alternative would begin east of North Arlington Avenue along the fully controlled access alignment of US 40. The alignment would enter a tunnel and would continue south under Fremont Street to the intersection of Lombard Street. The alignment would turn east under Lombard Street and continue under Lombard Street to exit the tunnel at the intersection of Lombard Street and Central Avenue.

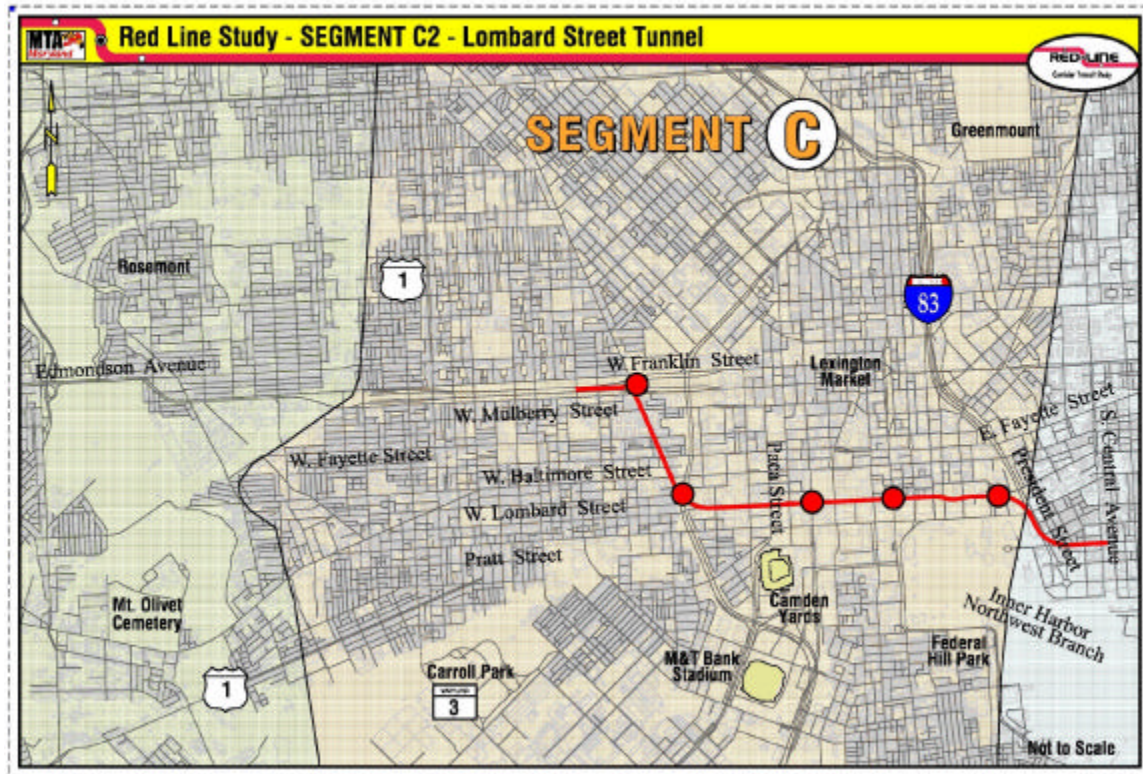


Figure 50: Lombard Street Tunnel Alternative from US 40 and North Arlington Avenue to Central Avenue and Eastern Avenue (BRT & LRT)

Pratt Street Alternative

The western terminus of this alternative would begin east of North Arlington Avenue along the fully controlled access alignment of US 40. The alignment would enter a tunnel and would continue south under Fremont Street to the intersection of Pratt Street. The alignment would turn east under Pratt Street and continue under Pratt Street to exit the tunnel at the intersection of Pratt Street and Central Avenue.

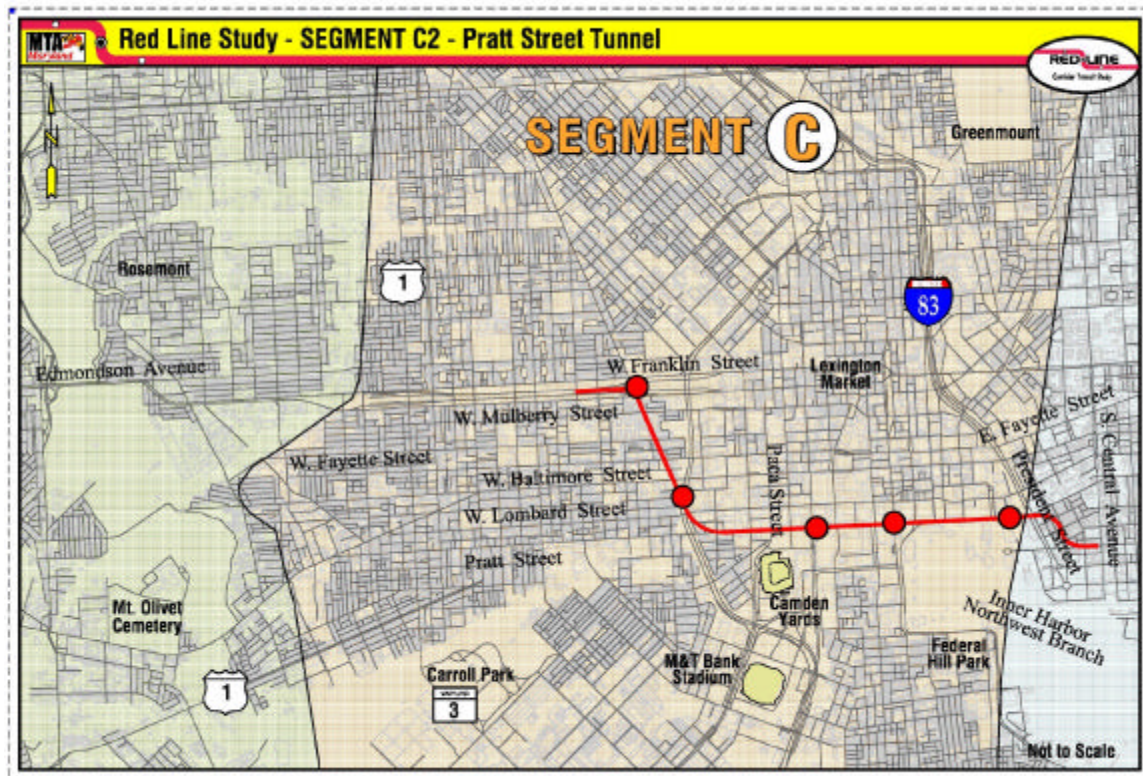


Figure 51: Pratt Street Tunnel Alternative from US 40 and North Arlington Avenue to Central Avenue and Eastern Avenue (BRT & LRT)

EVALUATION OF ALTERNATIVES

Evaluation measures have been selected to reflect the various advantages and disadvantages of each alternative. These evaluation measures are being used for screening all preliminary alternatives for the entire Red Line corridor. The measures are also consistent with criteria prescribed in the FTA Project Justification Rating and Evaluation categories (*i.e.*, New Starts) as well as the Red Line Corridor project goals stated in the Purpose and Need. Definitions for the measures are included in the Appendix.

The following table summarizes the data for the alternatives described above. Those measures that have been determined to have appreciable benefits when compared with other alternatives are shaded.

Table 21: Screening of Preliminary Alternatives, US 40 and Fremont Avenue to Central Avenue (BRT & LRT)

(Note: Shaded cells indicate measure with appreciable benefit.)

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT and LRT Tunnel Alternatives					
					Saratoga Street	Saratoga/ Pratt	Saratoga/ Fayette	Fayette Street	Lombard Street	Pratt Street
					2.0 Miles	2.3 Miles	2.0 Miles	2.1 Miles	2.3 Miles	2.3 Miles
Cost Effectiveness			Engineering Issues	Meets Design Criteria – <i>Yes or description of how criteria not met</i>	Yes	Yes	Yes	Yes	Yes	Yes
			Capital Costs	Preliminary Estimate - <i>millions</i>	\$455-\$556	\$557-\$671	\$404-\$505	\$413-\$517	\$456-\$570	\$457-\$571
Support Community Revitalization and Economic Development	Impacts and Equity	Transit- Supportive Land Use	Population Served	2000 Population within ¼-mile of Alignment	22,011	23,265	19,721	18,887	24,539	24,785
				2025 Population within ¼-mile of Alignment	28,595	32,894	26,278	24,959	33,730	34,493
			Access to Transit	% of Minority Population within ¼-mile of Alignment	76.5%	72.3%	85.3%	89.1%	68.6%	67.9%
				% of Low-Income Population within ¼-mile of Alignment	39.5%	37.4%	44.1%	46.1%	35.4%	35.1%
			Employment Served	2000 People Living within ¼- mile of Alignment Who Are Employed	7,644	8,738	6,181	5,543	8,405	8,647
				2025 People Living within ¼- mile of Alignment Who Are Employed	9,931	12,355	8,236	7,325	11,553	12,034
				2000 Jobs within ¼-mile of Alignment	76,032	81,281	86,588	87,914	84,321	67,451
			Neighborhood Structure	Activity Centers within ¼-mile of Alignment (Neighborhood Shopping Center (and larger), Entertainment District/Tourist Attractions, and Institutions (schools, hospitals, etc.))	34	39	36	36	41	35
				Significant Barrier to Walkability/Access - Yes/No	No	No	No	No	No	No
				Potential for Stations (<i>i.e.</i> , Quantity and Quality of Access) - <i>Low/Medium/High</i>	Medium	Medium	Medium	High	High	High
				Housing Density within a ¼-mile of Alignment – <i>Average # of Dwelling Units per Acre</i>	13.3	13.2	12.5	12.1	11.2	11.9

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT and LRT Tunnel Alternatives					
					Saratoga Street	Saratoga/ Pratt	Saratoga/ Fayette	Fayette Street	Lombard Street	Pratt Street
					2.0 Miles	2.3 Miles	2.0 Miles	2.1 Miles	2.3 Miles	2.3 Miles
Support Community Revitalization and Economic Development	Impacts and Equity	Transit- Supportive Land Use	Development Opportunity	Presence of Empowerment Zones/Enterprise Zones/SNAPs/Revitalization Districts within a ¼ mile of Alignment – Yes/No	Yes	Yes	Yes	Yes	Yes	Yes
				Potential for Development within a ¼-mile of Alignment – <i>Low/Medium/High</i>	High	High	High	High	High	High
				Approved development - <i>Square footage or number of units of new office and retail, number of new residential units within ¼-mile of alignment</i>	Heritage Crossing; UMBA Biotech Park (480,000 SF office); UMBA Dental School (367,000 SF High Rise); UMBA Student Dorms (337 bed High Rise); Center Point (372 apt); One Light Street Hotel (289 room); Marriott Residence Inn (125 DU); Flaghouse Courts Redevelopment (338 DU, 9 apt)					
					Westin Hotel; Lockwood Place (345,000 SF Office); Bohager's Site/Fells Point (40 condo units, 325 apts); Inner Harbor East (300 DU)	-	-		Westin Hotel; Lockwood Place (345, 000 SF Office); Bohager's Site/Fells Point (40 condo units, 325 apts); Inner Harbor East (300 DU)	
					-				Market Center West (302 apt units)	
					-		-		Convention Hotel	
			Transit-Oriented Development (TOD) Opportunity	Potential Sites for TOD and Renaissance Opportunities	0	0	0	0	0	0
Environmental Stewardship	Impacts and Equity	Environmental Benefits	Cultural Resources	Historic Districts within Area of Potential Effect (APE) (w/ elevated sensitivity)	8 (4)	5 (2)	7 (4)	9 (4)	6 (2)	8 (5)
				Other Historic Resources within APE ((w/ elevated sensitivity)	18 (9)	14 (4)	21 (9)	24 (10)	17 (9)	15 (4)
				Known Archeological Resources within APE	3	3	2	3	8	4
			Parklands	Number of Potentially Impacted Urban Lots	1-edge; 1- proximity	1-edge; 1- proximity	1-edge; 1- proximity	1-edge	1-edge	1-edge
				Number of Potentially Impacted Passive Parks	3-edge; 1- bisect	2-edge	3-edge	3-edge	2-edge	0
				Number of Potentially Impacted Play Lots	0	0	0	0	0	0
				Number of Potentially Impacted Regional Parks	0	0	0	0	0	0
				Number of Potentially Impacted Open Spaces	0	0	0	0	0	0

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT and LRT Tunnel Alternatives					
					Saratoga Street	Saratoga/ Pratt	Saratoga/ Fayette	Fayette Street	Lombard Street	Pratt Street
					2.0 Miles	2.3 Miles	2.0 Miles	2.1 Miles	2.3 Miles	2.3 Miles
Environmental Stewardship	Impacts and Equity	Environmental Benefits	Noise	Potential for Impact to Receptors along Alignment (houses, churches, hospitals, parks, etc.) – <i>Low/Medium/High</i>	None but w/ vibration	None but w/ vibration	None but w/ vibration	None but w/ vibration	None but w/ vibration	None
			Wetlands	Type (Crossings)	None	None	None	None	None	None
			Streams	Crossings	0	0	0	0	0	0
			Forests	Crossing(s) - <i>Linear Feet</i>	0	0	0	0	0	0
			100-Year Floodplains	Crossing(s) - <i>Linear Feet</i>	0	0	0	0	0	0
			Hazardous Material Sites	Potential Sites (Potential Risk)	4 (Moderate); 0 (Severe)	5 (Moderate); 0 (Severe)	4 (Moderate); 0 (Severe)	3 (Moderate); 0 (Severe)	4 (Moderate); 0 (Severe)	4 (Moderate); 0 (Severe)
			Rare, Threatened & Endangered Species Habitat	Area of Potential Habitat – <i>Acres</i>	0	0	0	0	0	0
Improve Transit System Connectivity	Effectiveness	Mobility and Operating Efficiencies	Intermodal Connections	Connection to Existing MARC – <i>Yes/No/Not Applicable (N/A) / Quality of Connection – High/Med/Low</i>	N/A	Yes/Low	Yes/Low	Yes/Low	Yes/Low	Yes/Med
				Connection to Existing Metro – <i>Yes/No/ Quality of Connection – High/Med/Low</i>	Yes/High	Yes/Med- High	Yes/Med	Yes/High	Yes/Med	Yes/Med
				Connection to Existing Light Rail – <i>Yes/No/ Quality of Connection – High/Med/Low</i>	Yes/Med	Yes/High	Yes/Med	Yes/High	Yes/High	Yes/High
				Existing Bus Routes along Alignment	3	3	3	4	7	3
				Buses on Bus Routes along Alignment- <i># per day</i>	852	852	852	880	886	356
				Existing Bus Routes Intersected	31	31	31	30	30	22
				Buses on Intersecting Bus Routes - <i># per day</i>	>2,000	>2,000	>2,000	>2,000	>2,000	>2,000
				Estimated Transit Travel Time - <i>minutes</i>	6.3	6.0	6.4	6.4	6.7	6.7
				Potential Location along the Alignment for a Major Park & Ride – <i>Yes/No</i>	No	No	No	No	No	No
Improve Transit System Connectivity	Effectiveness	Mobility and Operating Efficiencies	Intermodal Connections	Existing Pedestrian Level of Service (LOS) along Alignment	N/A	B-C	N/A	N/A	A-C	A-C
				Existing Bicycle LOS along Alignment	N/A	E	N/A	N/A	D-E	D-E
				Access to Existing/Planned Bicycle Trails along Alignment – <i>Yes/No</i>	Yes	Yes	Yes	Yes	Yes	Yes

Project Goals (from Purpose and Need)	FTA Evaluation Categories	FTA Project Justification Rating Categories (New Starts)	Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT and LRT Tunnel Alternatives					
					Saratoga Street	Saratoga/ Pratt	Saratoga/ Fayette	Fayette Street	Lombard Street	Pratt Street
					<i>2.0 Miles</i>	<i>2.3 Miles</i>	<i>2.0 Miles</i>	<i>2.1 Miles</i>	<i>2.3 Miles</i>	<i>2.3 Miles</i>
Improve Mobility, Efficiency and Accessibility	Effectiveness	Mobility and Operating Efficiencies	Transit Dependency	2000 Zero-Car Households within ¼-mile of Alignment	6,498	6,589	5,589	5,085	5,764	5,842
				2000 Households within ¼-mile of Alignment	13,226	14,703	11,492	10,722	14,140	14,429
				2000 Senior Citizens within ¼- mile of Alignment	2,635	3,206	2,271	2,097	2,973	3,033
				2000 School-Aged Children within ¼-mile of Alignment	1,970	1,788	1,893	1,988	2,242	2,252
			Traffic Characteristics	Intersections (signalized and unsignalized) along Alignment	2	0/3	2	2	3	3
				Signalized Intersections along Alignment	1	0/1	1	1	1	1
				Major Intersections along Alignment	1	0/0	1	1	0	0
				Average Daily Traffic along Alignment – <i>Vehicles per day</i>	0/12,000- 22,000	0/9,000- 18,000	0/12,000- 22,000	0/12,000- 22,000	0/9,000- 18,000	0/9,000- 18,000
				Travel Lanes in Peak Direction	0/2-3	0/1	0/2-3	0/2-3	0/1	0/1
				Existing Minimum Curb-to-Curb Width along Alignment – <i>Feet</i>	N/A	N/A	N/A	N/A	N/A	N/A
				Existing Minimum Right-of-Way Width along Alignment – <i>Feet</i>	N/A	N/A	N/A	N/A	N/A	N/A
				On-Street Parking – <i>Yes or No, length of parking eastbound (EB), length of parking westbound (WB)</i>	Yes EB = 0.0 mi. WB = 0.08 mi.	Yes EB = 0.08 mi. WB = 0.08 mi.	Yes EB = 0.0 mi. WB = 0.08 mi.	Yes EB = 0.0 mi. WB = 0.08 mi.	Yes EB = 0.08 mi. WB = 0.08 mi.	Yes EB = 0.08 mi. WB = 0.08 mi.



Evaluation Measure with Benefit

The following table highlights the evaluation measures only for which it was determined there is appreciable difference among alternatives. For these measures, the shaded cells indicate those with appreciable benefit compared with the other alternatives.

Table 22: Summary of Evaluation Criteria and Measures with Appreciable Benefit, US 40 and Fremont Avenue to Central Avenue (BRT & LRT)

Evaluation Criteria	Evaluation Measures – <i>Unit of Measurement</i>	BRT and LRT Tunnel Alternatives					
		Saratoga Street	Saratoga/Pratt	Saratoga/Fayette	Fayette Street	Lombard Street	Pratt Street
		2.0 Miles	2.3 Miles	2.0 Miles	2.1 Miles	2.3 Miles	2.3 Miles
Capital Costs	Preliminary Estimate - <i>millions</i>	\$455-\$556	\$557-\$671	\$404-\$505	\$413-\$517	\$456-\$570	\$457-\$571
Population Served	2000 Population within ¼-mile of Alignment	22,011	23,265	19,721	18,887	24,539	24,785
	2025 Population within ¼-mile of Alignment	28,595	32,894	26,278	24,959	33,730	34,493
Access to Transit	% of Minority Population within ¼-mile of Alignment	76.5%	72.3%	85.3%	89.1%	68.6%	67.9%
	% of Low-Income Population within ¼-mile of Alignment	39.5%	37.4%	44.1%	46.1%	35.4%	35.1%
Employment Served	2000 People Living within ¼-mile of Alignment Who Are Employed	7,644	8,738	6,181	5,543	8,405	8,647
	2025 People Living within ¼-mile of Alignment Who Are Employed	9,931	12,355	8,236	7,325	11,553	12,034
	2000 Jobs within ¼-mile of Alignment	76,032	81,281	86,588	87,914	84,321	67,451
Neighborhood Structure	Activity Centers within ¼-mile of Alignment	34	39	36	36	41	35
	Potential for Stations (<i>i.e.</i> , Quantity and Quality of Access) - <i>Low/Medium/High</i>	Medium	Medium	Medium	High	High	High
Cultural Resources	Historic Districts within Area of Potential Effect (APE) (w/ elevated sensitivity)	8 (4)	5 (2)	7 (4)	9 (4)	6 (2)	8 (5)
	Other Historic Resources within APE (w/ elevated sensitivity)	18 (9)	14 (4)	21 (9)	24 (10)	17 (9)	15 (4)
	Known Archeological Resources within APE	3	3	2	3	8	4
Noise	Potential for Impact to Receptors along Alignment (houses, churches, hospitals, parks, etc.) – <i>Low/Medium/High</i>	None but w/ vibration	None but w/ vibration	None but w/ vibration	None but w/ vibration	None but w/ vibration	None
Intermodal Connections	Existing Bus Routes along Alignment	3	3	3	4	7	3
	Buses on Bus Routes along Alignment- # <i>per day</i>	852	852	852	880	886	356
	Existing Bus Routes Intersected	31	31	31	30	30	22
Transit Dependency	2000 Zero-Car Households within ¼-mile of Alignment	6,498	6,589	5,589	5,085	5,764	5,842
	2000 Households within ¼-mile of Alignment	13,226	14,703	11,492	10,722	14,140	14,429
	2000 Senior Citizens within ¼-mile of Alignment	2,635	3,206	2,271	2,097	2,973	3,033



Evaluation Measure with Benefit

For each of the evaluation criteria listed above, the following conclusions are made in the comparison of alternatives:

Capital Costs

- The Saratoga/Fayette and Fayette Street Alternatives are estimated to have \$50 to \$150 million less in capital costs.

Population Served

2000 and 2025 Population within 1/4-mile of Alignment

- In 2000, 2,000 to 6,000 fewer people resided near the Saratoga/Fayette and Fayette Street Alternatives than the other alternatives. Likewise in 2025, 2,000 to 10,000 fewer people are projected to reside near the Saratoga/Fayette and Fayette Street Alternatives.

Access to Transit

Percent of Minority and Low Income Population within 1/4-mile of Alignment

- A higher percentage of both the minority and low income population reside near the Saratoga/Fayette and Fayette Street Alternatives.

Employment Served

2000 and 2025 People Living within 1/4-mile of the Alignment Who Are Employed

- More people who are employed live and are projected to live near the Saratoga Street, Saratoga/Fayette and Fayette Street Alternatives.

2000 Jobs within 1/4-mile of Alignment

- Fewer jobs are near the Saratoga Street and Pratt Alternatives.

Neighborhood Structure

Activity Centers within 1/4-mile of Alignment

- The Fayette Street, Lombard Street, and Pratt Street Alternatives are near the important activity centers at the University of Maryland-Baltimore, the stadiums, and the convention center.

Potential for Stations (i.e., Quantity and Quality of Access)

- The Fayette Street, Lombard Street, and Pratt Street Alternatives have the highest potential for stations to serve many riders because of the proximity to key activity centers.

Cultural Resources

Historic Districts within the Area of Potential Effect (APE)

- Fewer historic districts are within the APE (within approximately 500 feet of the alignment) for the Saratoga/Pratt and Lombard Street Alternatives.

Individual Historic Properties within the APE

- Fewer individual historic properties are within the APE (within approximately 500 feet of the alignment) for the Saratoga/Pratt and Pratt Street Alternatives.

Known Archeological Resources within the APE

- The Lombard Street Alternative has more known archeological resources within the APE (within approximately 100 feet of the alignment).

Noise

Potential for Impact to Receptors along Alignment

- Because all alternatives are in tunnels, none would have potential noise impacts; however, all alternatives but the Pratt Street Alternative would potentially impact vibration-sensitive receptors.

Intermodal Connections

Existing Bus Routes along Alignment

- The Lombard Street Alternative has more bus routes along the existing streets.

Buses on Bus Routes along Alignment

- The Pratt Street Alternative has approximately 500 fewer buses along the existing streets.

Existing Bus Routes Intersected

- The Pratt Street Alternative has eight to nine fewer bus routes intersecting the existing streets.

Transit Dependency

2000 Zero-Car Households within ¼-mile of Alignment

- More households without a car reside near the Saratoga Street and Saratoga/Pratt Alternatives.

2000 Total Households and Senior Citizens within ¼-mile of Alignment

- Fewer total households and senior citizens reside near the Saratoga/Fayette and Fayette Street Alternatives.

RECOMMENDATION

Based on the above evaluation, it is recommended that the Saratoga Street, Saratoga/Pratt, Saratoga/Fayette and Pratt Street BRT and LRT Tunnel Alternatives from US 40 and North Arlington Avenue to Central Avenue and Eastern Avenue not be carried forward for further study.

The rationale for this recommendation is summarized in the following points:

- 1) Based on the evaluation measures, the Fayette Street and Lombard Street Alternatives have more positive attributes. In particular, these alternatives yield:
 - Lower capital cost (Fayette Street)
 - More jobs nearby
 - More activity centers nearby, particularly the University of Maryland-Baltimore, the stadiums, and the convention center.
- 2) Specific reasons to eliminate the Saratoga Street, Saratoga/Fayette, Saratoga/Pratt and Pratt Street Alternatives include:
 - Higher capital cost (Saratoga Street, Saratoga/Pratt and Pratt Street)
 - Fewest activity centers nearby, particularly the University of Maryland-Baltimore, one of downtown's largest employers (Saratoga Street, Saratoga/Pratt and Saratoga/Fayette)

- Fewer jobs nearby (Saratoga Street and Pratt Street)
 - Less potential for stations (Saratoga Street, Saratoga/Pratt and Saratoga/Fayette)
- 3) Of the alternatives recommended for no further study, only the Pratt Street Alternative has a unique advantage: no potential impact to vibration-sensitive receptors. Vibration caused by either the Fayette Street or Lombard Street Alternatives may be avoided or mitigated in the next phase of study through more refined development of the alternatives.

The following illustrates the alignment for the alternatives recommended for further study (Fayette Street and Lombard Street) in contrast to the alternatives recommended for no further study (Saratoga Street, Saratoga/Pratt, Saratoga/Fayette and Pratt Street).

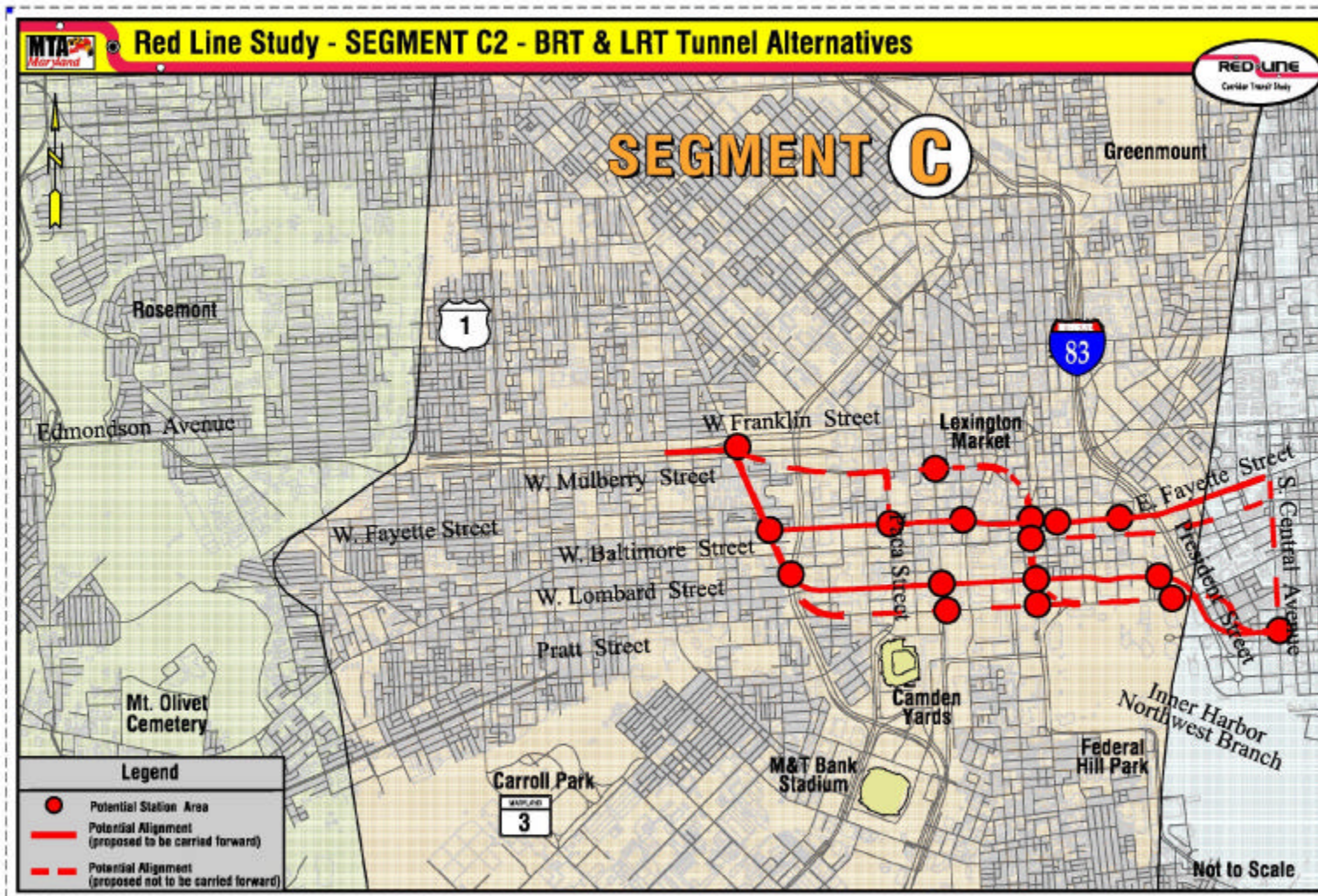


Figure 52: US 40 and North Arlington Avenue to Central Avenue and Eastern Avenue BRT and LRT Tunnel Alternatives Recommended for Further Study

APPENDIX

Evaluation Measure Definitions

The following is a summary definition of the technical approach utilized in developing the evaluation matrix.

Segment Lengths

The segments were laid out over the GIS base mapping and measured using MicroStation.

I. Cost Effectiveness

A. Engineering Issues

i. Meets Design Criteria

The alternative preliminarily meets the preferred design criteria established for the mode evaluated. Any design criteria which approached the minimum parameters or exceeds it are identified.

B. Capital Costs

i. Preliminary Cost Estimate

A high and low range of costs per mile was applied to tunnels, at grade and aerial alignments for both BRT and LRT guideways. For the alignments under consideration, the measured length of each type of construction was developed in a CADD file using City and/or County mapping, stationed along actual curvature and tangents. For tunnel segments, profiles were developed to determine length, and the tunnel length was measured from portal to portal, without regard to whether the tunnel is bored or cut-and-cover.

II. Transit Supportive Land Use

A. Population Served

i. 2000 Population within 1/4 Mile of Alignment

Developed from Baltimore City/County 2000 census data.

ii. 2025 Population with 1/4 Mile of Alignment

Developed from Baltimore City/County 2000 census data.

B. Access to Transit

i. % of Minority Population within 1/4 mile of Alignment

Developed from Baltimore City/County 2000 census data.

- ii. *% of Low-Income Population within 1/4 mile of Alignment*
Developed from Baltimore City/County 2000 census data. The percentage is based on the number of people living in the household, however the measure to determine low-income is based upon the total household income being at or below the national poverty level as established by HUD. This national poverty level is \$18,000 for a household of four.

C. Employment and Jobs Served

- i. *2000 – People Living within 1/4 mile of Alignment who are Employed*
Developed from Baltimore City/County 2000 census data.
- ii. *2025 – People Living within 1/4 mile of Alignment who are Employed*
Developed from Baltimore City/County 2000 census data.
- iii. *2000 - Number of Jobs within 1/4 Mile of Alignment*
Developed from Baltimore City/County 2000 census data.

D. Neighborhood Structure

- i. *Activity Centers within 1/4 mile of Alignment*
All activity centers within the 1/4 mile buffer created for each alignment within a given segment were counted. Activity centers include all neighborhood shopping centers (and larger), entertainment districts, tourist attractions, institutions such as schools, hospitals, etc.
- ii. *Significant Barrier to Walkability and Access*
Existing conditions were examined for barriers that would prevent access to the alignment, not specific station locations. Items such as freeways, railroads, as well as natural barriers such as water or steep slopes were considered if they were in the path of potential walking patrons towards the alignment. For the purposes of an equitable evaluation between alternatives, proposed designs in which to overcome the barrier were not taken into consideration.
- iii. *Station Potential*
Station potential was determined by the potential quantity of stations along a given alignment within a segment as well as the overall quality of access to any potential segments.

- iv. *Housing Density within 1/4 mile of Alignment*
Developed from Baltimore City/County 2000 census data.

E. Development Summary

- i. *Presence of Empowerment Zones/Enterprise Zones/SNAPs/Revitalization Districts within a 1/4 Mile of Alignment*
Determination of any tax-benefit zones within the area of the alignment
- ii. *Potential for Development within a 1/4 Mile of Alignment*
The potential for development was ranked as high/medium/low based upon the number of planned, yet not approved, developments. This included residential plans, commercial plans, etc. In addition, the presence of master planning efforts also was taken into account for this ranking. This information was provided by Baltimore County, Baltimore City Planning Department, and through internet research of the region.
- iii. *Approved Development within a 1/4 mile of Alignment*
Pipeline and other approved development as provided by Baltimore County and Baltimore City's Planning Department.

F. Transit Oriented Development (TOD) Opportunity

- i. *Potential Sites for TOD and Renaissance Opportunities*
Potential sites were identified based on input from respective public agencies and alignment tours. Potential sites were included in the matrix if there is an availability of land, either vacant or under-utilized, that may constitute a significant "critical mass" if redeveloped.

III. Environmental Benefits

A. Cultural Resources

- i. *Historic Districts within Area of Potential Effect (APE)*
The Historic District included all previously identified resources and the Area of Potential Effect (APE) was defined as either 250 feet on each side of the center line (in areas of higher urban density east of the Gwynns Falls) or 500 feet on each side of the center line (in areas of lower urban density west of the Gwynns Falls). Districts along tunnel sections were included due to potential secondary surface impacts.

ii. *Other Historic Properties within APE*

The Historic Properties included all previously identified resources as well as those properties identified during the Red Line survey which were deemed likely to be found eligible for the National Register of Historic Places. The APE for historic properties was defined as either 250 feet on each side of the center line (in areas of higher urban density east of the Gwynns Falls) or 500 feet on each side of the center line (in areas of lower urban density west of the Gwynns Falls). Properties along tunnel sections were included due to potential secondary surface impacts. The analysis also provided a count of resources of elevated historic sensitivity (for example National Historic Landmarks, historic religious properties and cemeteries).

iii. *Known Archeological Resources within APE*

Known archeological sites that fell within a specific Area of Potential Effect (APE) along each alignment were included in this measure (resources along tunnel sections were also included due to potential secondary surface impacts). The APE for archaeological resources was defined as 100 feet on each side of the alignment center line.

B. Parklands

(same criteria for all parkland types)

Impacts to parkland were evaluated for inventoried parkland properties within 500 feet of the BRT and LRT alignments having the potential for a direct right-of-way use of the property (bisect or edge impact); or, the potential for a Section 4(f) constructive use of the property (proximity impact) related to potential noise, visual, access, or vibration impacts that require further evaluation. These evaluators were applied for the tunneling alternatives, however, it was noted that Section 4(f) impacts would apply only if the tunneling causes disruption which will harm the purposes for which the park or recreation was established.

C. Noise

i. *Potential for Impact to Receptors along Alignment*

The noise parameter (low, medium, high) describes the overall impact on ambient noise levels.

D. Wetlands

i. *Type (crossings)*

Impacts to Wetlands and Waters of the United States were approximated by examining project mapping, National Wetland

Inventory Mapping (NWI) and Maryland Department of Natural Resources (DNR) GIS information. Quality of the wetland resource was based upon best professional opinion and field reconnaissance.

E. Streams

i. Crossings

Only naturally intact streams were evaluated. Streams which have been piped beneath urbanized areas were not evaluated because they are unregulated.

F. Forests

i. Linear Feet of Forested Area along Alignment Center Line

Impacts to forested areas were approximated by examining project mapping and recent aerial photography and calculating linear feet of forested area along alignment center line.

G. 100-Year Floodplain

i. Crossings

Floodplain impacts were approximated by examining project mapping and GIS information containing the Federal Emergency Management Agency (FEMA) 100-year floodplain mapping.

H. Hazardous Materials Site

i. Potential Sites (Moderate Risk/Severe Risk)

The identification of potential sites and estimation of the potential risk is based on MDE and EPA databases of properties with regulatory actions and, where allowed, review of the MDE files for the property. All sites designated as moderate or severe risk of contamination are sites with documented soil and/or groundwater contamination that are located adjacent to or upgradient from the route alternate. Excavation, especially deeper excavation, near these sites presents a risk that contaminated materials will be encountered that will require special management and disposal procedures, resulting in some degree of increased construction cost.

I. RTE Habitat

i. Area of Potential Habitat

Rare, Threatened and Endangered Species (RTE) habitat impacts were approximated by examining the DNR GIS information which displays a polygon on any location known as RTE habitat from either recent or historical records.

IV. Mobility and Operating Efficiencies

A. Intermodal Connections

- i. Connection to Existing Metro, MARC, Light Rail/Quality of Connection*
Determination of the alignment within a segment connecting to an existing rail transit line. The quality of the connection is assessed high/medium/low based on the approximate walking distance for the transfer.
- ii. Existing Bus Routes along Segment*
Determined through MTA bus schedules.
- iii. Buses on Bus Routes along Segment*
Determined through MTA bus schedules and operations.
- iv. Existing Bus Routes Intersected*
Determined through MTA bus schedules.
- v. Buses on Intersecting Bus Routes*
Determined through MTA bus schedules and operations.
- vi. Estimated Transit Travel Time*
A general spreadsheet based model that accounts for acceleration/deceleration of vehicles, station stops, and intersections.
- vii. Potential Location along the Alignment for a Major Park & Ride Facility*
Ability for a regional park & ride to be built within the segment.
- viii. Existing Pedestrian Level of Service (LOS) for Alignment*
Level of service for pedestrian facilities as provided by BMC.
- ix. Existing Bicycle LOS for Alignment*
Level of service for bicycle facilities/roadways as provided by BMC.
- x. Access to Planned/Existing Bicycle Trails in the Segment*
Potential access to planned facilities as provided by Baltimore County, Baltimore City Planning Department, and internet research.

B. Transit Dependency

- i. 2000 Zero-car Households within 1/4 mile of Alignment*
Developed from Baltimore City/County 2000 census data.
- ii. 2000 Households within 1/4 mile of Alignment*
Developed from Baltimore City/County 2000 census data.
- iii. 2000 Senior Citizens within 1/4 mile of Alignment*
Developed from Baltimore City/County 2000 census data.
- iv. 2000 School Aged Children within 1/4 mile of Alignment*
Developed from Baltimore City/County 2000 census data.

C. Traffic Characteristics

- i. Intersections (signalized and unsignalized) in Segment*
Field verification of the total number of intersections that a given alignment would cross within the segment length.
- ii. Signalized Intersections along Segment*
Field verification of the number of signalized intersections that a given alignment would cross within the segment length.
- iii. Major Intersections along Segment*
Major Intersections were based on the average daily traffic(ADT) of the road that the red line was paralleling and the cross road. Both roads ADTs needed to exceed approximately 6,000 vehicles per day to be considered a major intersection.
- iv. Average Annual Daily Traffic (ADT) along Corridor in Segment*
ADT was calculated through traffic counts obtained from the Red Line study. The State Highway's Traffic Trends Manual was also used in conjunction with the team's development of ADT's for various roadway segments.
- v. Travel Lanes in Peak Direction*
The total travel lanes in the peak direction were counted (i.e. US 40 has three travel lanes in the peak direction due to parking lane restrictions being in place during peak hours).
- vi. Existing Minimum Curb to Curb Width along Segment*
The edge of pavement line work from the GIS base mapping was measured using MicroStation.

vii. *Existing Minimum Right of Way width along Segment*

The right of way line work from the GIS base mapping was measured using MicroStation.

viii. *On-street Parking*

Field verification of the presence of on-street parking within the segment for both the eastbound and westbound directions. On-street parking was considered regardless of restrictions and/or permit use.

Appendix E

Red Line Extension to Bayview Feasibility Study, August 6, 2007

Office of Planning

Red Line Extension to Bayview

FEASIBILITY STUDY

AUGUST 6, 2007



Office of Planning
6 St. Paul Street
Baltimore, Maryland 21202-1614

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I. EXECUTIVE SUMMARY

1. PURPOSE

The primary purpose of the Red Line Extension to Bayview Feasibility Study was to investigate potential alignments and stations for an extension of a Red Line Transit project into the Bayview area. A secondary purpose was to determine the compatibility of the extension alternatives with the potential future extension of the Red Line to Dundalk/Turners Station. The study focuses on physical and operational feasibility. The study does not attempt to make a case for whether or when an extension to Bayview is merited, only how it might be accomplished. Also, the level of detail used in the study was focused on feasibility, not on developing refined engineering solutions.

2. CONCLUSION

Twenty alternative alignments were developed and are presented in this study. There are a number of potentially feasible alignments. The most feasible alignments are shown in Figure 1.1. They are as follows:

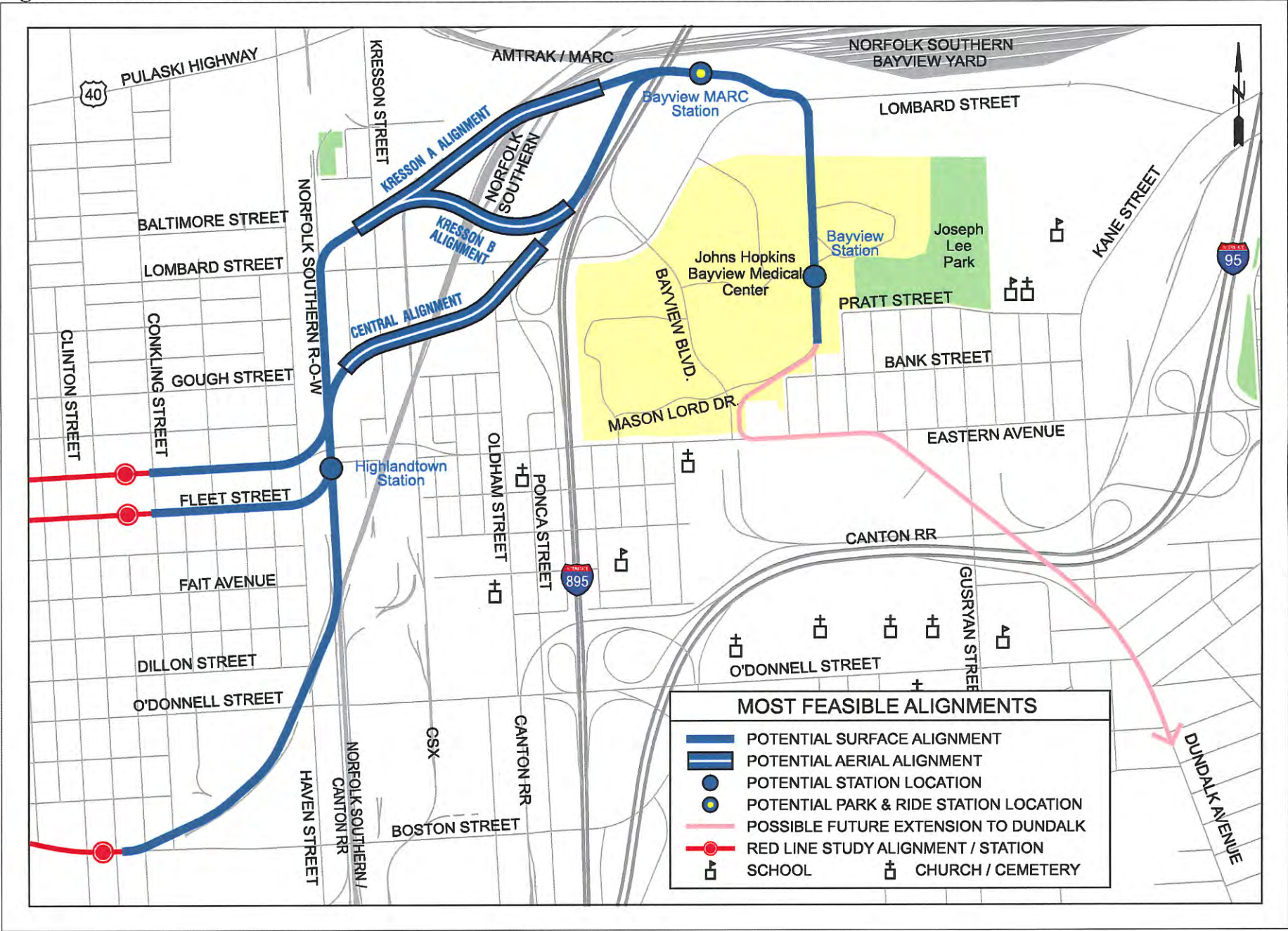
- Central Alignment (from Boston Street)
- Kresson A Alignment (from Boston Street)
- Kresson B Alignment (from Boston Street)
- Central Alignment (from Eastern-Fleet)
- Kresson A Alignment (from Eastern-Fleet)
- Kresson B Alignment (from Eastern-Fleet)

Three of these alternative alignments originate from the Boston Street Corridor in the Canton Crossing area whereas the other three originate from Eastern Avenue and Fleet Street. All six of these alignments would extend the Red Line transit project area to the Bayview Campus.

The three alternative alignments that begin at Boston and Conkling Streets would utilize the abandoned Norfolk Southern (NS) Railroad right-of-way at surface level, cross under the O'Donnell Street Viaduct, cross Haven Street at-grade, and continue at-grade to the inactive Norfolk Southern/Canton Railroad corridor. At that point, each of the three alternative alignments would continue north at-grade on the east side of the railroad right-of-way. Each of the three alignment alternatives would leave the railroad right-of-way and proceed east, primarily on aerial structure. The differences in the three alternatives are the specific locations of the aerial structures. The Central Alignment turns east near Bank and Gough Streets, while the Kresson A and Kresson B alignments turn east north of Lombard Street.

The three alternative alignments that begin at Eastern Avenue and Fleet Street would continue east on the surface of Eastern and Fleet to Haven Street. After crossing Haven Street at grade they would turn northward onto the currently inactive NS right-of-way. From this point further, these alternative alignments follow the same route as the previously discussed alignment alternatives from Boston and Conkling Streets.

Figure 1.1: RED LINE EXTENSION TO BAYVIEW – MOST FEASIBLE ALIGNMENTS



All six of these alignments cross over active railroad rights-of-way, under I-895, to a Bayview North Station near the proposed East Baltimore MARC Station, and to the Bayview Campus. The three Boston Street alternatives are all estimated to cost in the range of \$190 million to construct. The Eastern-Fleet alternatives are generally in the range of \$160 million to construct except the Kresson A Alignment (from Eastern-Fleet) which is estimated to be \$112 million. These cost estimates have been derived using a gross level cost methodology that would need to be further refined using more detailed engineering and cost estimating. The current estimates do, however, provide a comparative order of magnitude cost. See Appendix D for detailed cost estimates.

The Maryland Transit Administration is currently conducting an Alternatives Analysis/Draft Environmental Impact Study for an east-west corridor in the Baltimore Region from Woodlawn to Canton Crossing/Patterson Park. The study is investigating the purpose, need and possible solutions for improving transit in the corridor. The study is commonly referred to as the Red Line Corridor Transit Study. The study resulted from a 2002 Baltimore Region Transit Plan which prioritized the Red Line Corridor as a high priority corridor for implementation. The Red Line corridor in the Rail Plan indicated a line extending to Dundalk/Turners Station with a station in the Bayview area. Although the current Red Line Study is limited to Canton Crossing/Patterson Park, an understanding of how a project would be extended to the east is critical, when contemplating alternative Red Line solutions within the current study limits. There has also been considerable interest expressed by the City of Baltimore and the Johns Hopkins Medical Institution, as to how a project might be extended to the Bayview area.

3. GOALS FOR THE EXTENSION

As extensions to Bayview were developed, certain goals were to be achieved, if possible:

- Serve the Bayview Campus, with 5,000 existing jobs, plans for 5,000 more jobs, and hundreds of daily visitors.
- Provide an intermodal connection to the proposed East Baltimore MARC Station.
- Provide a park-and-ride lot for Red Line commuters with easy access from I-95 or I-895.
- Increase ridership on a Red Line Transit project by providing increased access.
- Support and integrate with existing and potential development.

A conclusion that was reached in this study was that, in general, three stations would help meet the above goals and provide acceptable spacing: a station in the area of Eastern Avenue/Greektown/east end of Highlandtown, a station serving a joint Red Line and MARC park-and-ride lot (with an easy transfer between modes), and a station serving the Bayview campus.

4. RANGE OF ALIGNMENT ALTERNATIVES

The current Red Line Study has two possible alignment alternatives at the east end of the project. One alignment ends in the Boston Street corridor in the Canton Crossing area. Another alignment ends in the Eastern Avenue/Fleet Street corridor in the Patterson Park/Highlandtown area. As alignment alternatives were developed for this study, it became apparent that there were four groups of alignment alternatives to extend the Red Line to the Bayview area:

- Boston Street to Eastern Avenue
- Boston Street to the proposed East Baltimore MARC Station and Bayview Campus
- Eastern Avenue continuing on Eastern Avenue.
- Eastern Avenue to the proposed East Baltimore MARC Station and Bayview Campus

As this study evolved, it became clear that there was a strong desire to connect the Red Line with the proposed East Baltimore MARC Station and serve Bayview as best as possible.

Therefore, the most feasible alignment alternatives described in the Conclusion section above focus on connections from both Boston Street and Eastern-Fleet to the proposed east Baltimore MARC Station and Bayview Campus. Also, although no decisions have been made, it appears as though the Boston Street corridor may be more feasible than the Eastern/Fleet corridor for the Red Line.

The alignment alternatives were also developed with certain guidelines in mind:

- Use existing railroad or roadway corridors where possible
- Minimize or eliminate need for private right of way takes and relocations.
- Avoid conflicts with operating railroads or roadways that would severely impact transit operations.
- Minimize capital costs by using at-grade solutions, if possible, then aerial, and then subway only if absolutely needed.
- Develop alignment alternatives that had no environmental fatal flaws.

It is important to note that light rail technology, geometric requirements, and capital cost estimates were used for this feasibility study; however, the alignments shown can work for either BRT or LRT. Where the Red Line and freight rail will be sharing the same right-of-way, the LRT vehicle can run on the rail tracks without the need for any physical changes. For the BRT option, the freight rail tracks must be embedded in the Red Line running way.

5. REPORT ORGANIZATION

The STUDY BACKGROUND chapter discusses why the Bayview Feasibility Study was initiated; how it relates to the existing Red Line Corridor Transit Study and the opportunities and constraints that it may encounter. The POTENTIAL ALIGNMENTS & STATIONS chapter discusses each alternative alignment in detail, including a description of specific criteria such as constructability, economic development potential, and impacts to traffic, businesses, residences and parking. The discussion about station locations is also addressed in this chapter. The Evaluation Matrix summarizes the comparative analysis of the alignment alternatives. The APPENDIX contains detailed information on existing conditions - socioeconomic, land use and communities; railroad network, right-of-way ownership and usage agreements; existing street sections, parking and bus stops; and preliminary cost estimates.

II. STUDY BACKGROUND

1. INTRODUCTION

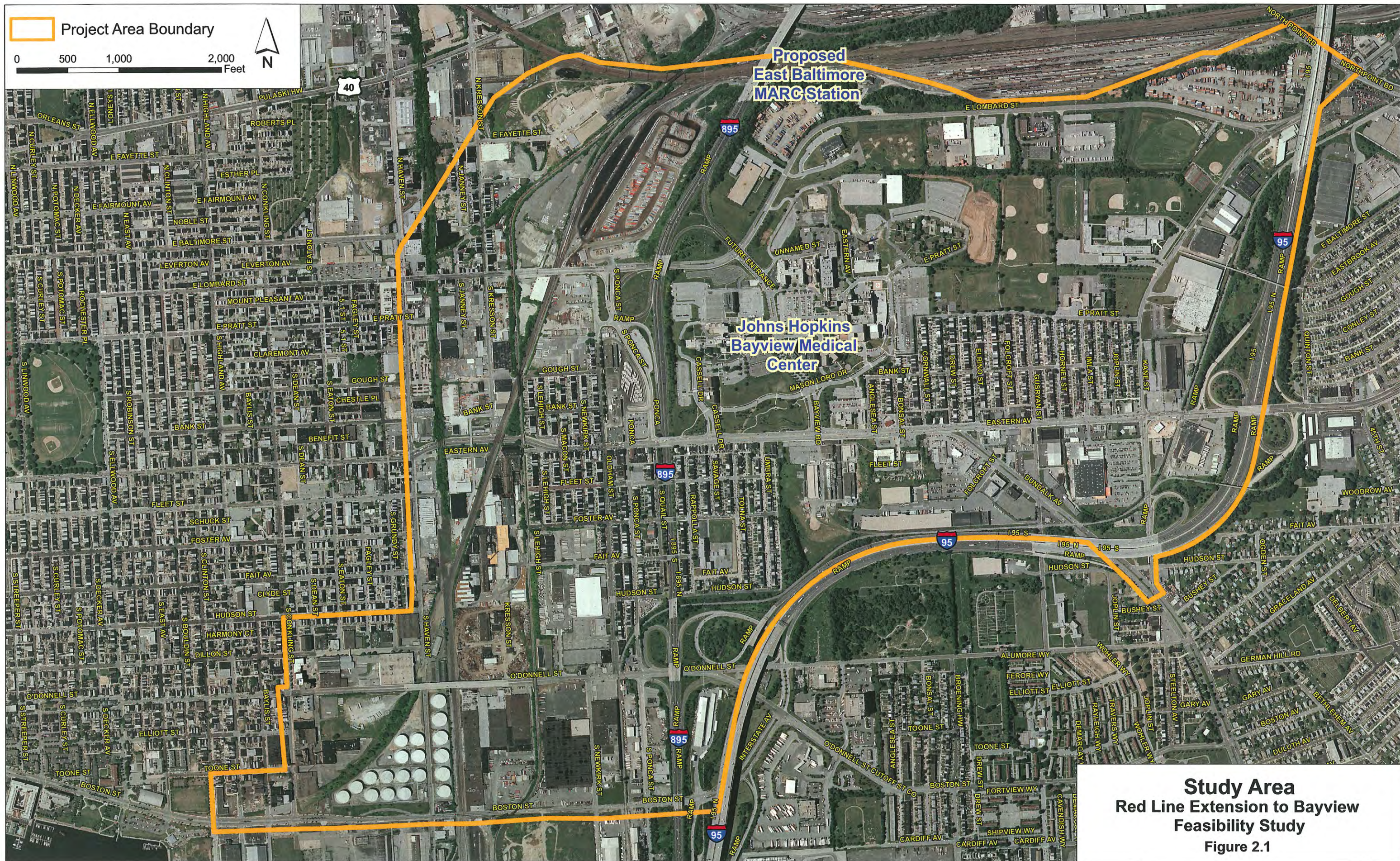
The Baltimore Region Transit System Plan (BRTSP), which was adopted in March, 2002, was prepared at the request of the Maryland Department of Transportation to identify the long range rapid transit needs of the greater Baltimore area. The conceptual study corridor for the Red Line was later identified as a priority project by the formulators of the BRTSP, with study limits set from CMS and I-70 Park and Ride in the west to Canton and Patterson Park in the east. The eastern study limits along the Eastern Avenue/Fleet Street corridor were later extended to Conkling Street to permit a feasible north-south connection between the two eastern legs of the Red Line. Along its 10.5-mile east-west route, the Red Line would connect the Woodlawn area of Baltimore County, Edmondson Village in Baltimore City, West Baltimore communities, downtown Baltimore and communities in the vicinity of Harbor East, Fells Point, Highlandtown and Canton/Canton Crossing. The Red Line would serve major employers and institutions such as the Centers for Medicare and Medicaid Services (CMS), the Social Security Administration, and the University of Maryland, Baltimore. In addition, the Red Line would provide connections to Baltimore's existing transit system—Metro Subway, Light Rail and MARC lines. Alternative modes being considered for the Red Line include Bus Rapid Transit (BRT) and Light Rail Transit (LRT).

The Johns Hopkins Bayview Medical Center and Dundalk community were identified in the Regional Transit System Plan as potential future destinations in the built-out transit network. Bayview is roughly bounded by I-895 to the west, Lombard Street to the north, a multitude of City-owned and privately-owned properties to the east, and Eastern Avenue to the south. Bayview is a major employer and public health institution in East Baltimore, with more than 5,000 employees. There are approximately 22,000 admissions per year at this facility with another 450,000 outpatients served. Bayview is undergoing an expansion program that could ultimately lead to a total buildout of approximately five million square feet from its current size of about 2.5 million square feet. The National Institute of Health's new Bayview Research Center is expected to be completed in 2007. This major growth in the near future will attract more students, patients, doctors, staff and other auxiliary users to the facility, making Bayview an even larger destination and travel generator in the area.

The primary objective of this feasibility study is to evaluate potential alignments and station locations for the future extension of the Red Line to Bayview and determine if there are implications for the alignment and stations evaluations being conducted for the current Corridor Transit Study.

2. STUDY AREA

The study area is generally bounded by the following streets – Boston Street, Kane Street and I-95 to the south and east, Lombard Street to the north and Haven Street to the west. Figure 2.1 shows the study area boundaries. In addition to the Johns Hopkins Medical Center campus, this area comprises several residential neighborhoods, commercial and industrial locations and several redevelopment areas.



3. OPPORTUNITIES AND CONSTRAINTS

The extension of the Red Line to Bayview presents both challenges and opportunities. There are several characteristics of the study area that have provided opportunities to extend the existing Red Line Corridor to the study area and beyond, the Johns Hopkins Bayview Medical Campus being the most significant. The existing residential neighborhoods, the industrial areas in the process of change and the existing railroad network present a mix of constraints and opportunities. These are discussed in the following section.

A. STUDY AREA DESTINATIONS AND POTENTIAL STATION LOCATIONS

Planning for a future extension of the Red Line eastward from either of the above termini has generally considered using the Eastern Avenue corridor to reach Dundalk Avenue, from which point the line would be extended to its ultimate terminus in Dundalk or Turner Station. However, there has been considerable interest on the part of the Johns Hopkins Bayview Medical Center to have the Red Line extended to or through its campus located north of Eastern Avenue and south of Lombard Street. A planned East Baltimore MARC station along Lombard Street immediately north of the medical center campus has also provided a future opportunity for connectivity between the Red Line and the MARC commuter rail system.

This now presents two destination alternatives for each of the two sets of alignments being considered. The Bayview Medical Center can be serviced directly from the Eastern Avenue corridor as well as from the Lombard Street, based on the Johns Hopkins Bayview Campus - Buildout Plan, see Figure 2.2. However, the future MARC station can not be serviced directly from Eastern Avenue, and would require a shuttle service of some kind to provide connectivity between the systems. An alternative to this arrangement would be to extend the Red Line directly to the future MARC station, and loop back toward the Eastern Avenue corridor through the proposed Mason Lord Drive which is shown in the Buildout Plan for the Johns Hopkins Bayview Campus.

Between the two destinations (Bayview and East Baltimore MARC) and the existing Red Line Corridor, there are several residential neighborhoods. These neighborhoods may support transit and the residents could benefit from improved transit in the area. The housing densities have indicated some support for transit. Within the same geographic area, there are industries that are either shut down, relocated or are in process of shutting down. Several of these have been identified by the City as having redevelopment potential. With the planned and proposed redevelopment projects, the numbers for housing units and densities are likely to improve. Based on these factors and the results of the Community Demographics Analysis (discussed in Appendix A, Page 97) it is suggested that the residential neighborhoods of Highlandtown and Greektown may be considered for a potential station location.

FIGURE 2.2: JOHNS HOPKINS BAYVIEW CAMPUS - BUILDOUT PLAN



SOURCE: JOHNS HOPKINS REAL ESTATE

B. RAILROAD NETWORK

The extension of the Red Line to Bayview presents both challenges and opportunities due to the presence of a cluster of railroad tracks running north-south in a corridor between Haven and Ponca Streets. These railroad tracks and rights-of-way, shown in Figure 2.3, are owned by several different railroad companies. These are as follows:

- Canton Railroad Company (CTN)
- CSX Transportation, Inc. (CSXT)
- Norfolk Southern Corp (NS)

These tracks see continual movements of freight trains and therefore can not be crossed at grade. Further, transit alignments parallel to the CSXT or NS tracks must be kept at least 25 feet from the centerline of the railroads' nearest operating track, per Federal Railroad Administration (FRA) regulations. However, in the case of CSX tracks this separation must be 50' in the absence of crash walls. While most of the railroads' rights-of-way present an impediment to the location of transit alignments, a few abandoned or under-utilized rights-of way offer opportunities for locating the transitway in a former transportation corridor.

Sections of Canton Railroad, Norfolk-Southern and CSX may be used for locating transit alignments. The challenges include the need for grade separation, operating agreements and potential conflict with rail freight operations. These will be addressed on alignment by alignment basis depending upon the nature and location of the challenge. The specific challenges and opportunities associated with each of these railroads are briefly discussed here. See Appendix C, Page 126 for detailed descriptions.

Canton Railroad Company (CTN)

The CTN track in the eastern-most corridor has one train each way three or four days per week. The CTN has a 60-foot right-of-way along the portion of this corridor that may be used for a potential transit alignment between O'Donnell Street and the Pemco property. This right-of-way is not wide enough to maintain an FRA-mandated 25-foot horizontal separation between the transitway and an active railroad track. Therefore the transit operating plan will have to incorporate some provision for separation of freight and transit uses by time limits.

CSX Transportation, Inc. (CSXT)

The CSXT track has one or two trains per day. It appears that the abandoned CSXT right-of-way north of Lombard Street between the active CSXT tracks and the inactive NS right-of-way may provide a viable alternative to placing the transitway in Lombard Street.

Norfolk Southern Corp (NS)

The abandoned NS right-of-way between Conkling and Haven Streets may be utilized for a dedicated transitway from Boston Street to Haven Street and beyond. The inactive NS right-of-way could also play a role in threading the Red Line through this rail corridor. While owned by NS, the right-of-way is currently leased on an annual basis by CTN. This right-of-way is not wide enough to maintain an FRA-mandated 25-foot horizontal separation between the transitway and an active railroad track. Therefore the transit operating plan will have to incorporate some provision for separation of freight and transit uses by time limits.

This aerial map illustrates the proposed rail corridor through Canton, New York. The map features several key elements:

- Proposed Rail Lines:** The NS (Norfolk Southern) and CSX lines are shown running vertically through the center of the map. A third line, labeled 'Reserved For Future Use to H&S', is shown to the west.
- Right-of-Way (R.O.W.) Callouts:** Various segments of the rail line are marked with callouts indicating their width:
 - 66'-82" Right-of-Way (near the top left)
 - 78' Right-of-Way (near E. Lombard Street)
 - 100'-110' Right-of-Way (near CSX line)
 - 72'± Right-of-Way (near NS line)
 - 60'-80' Right-of-Way (near CSX line)
 - 100' Right-of-Way (near NS line, near Crown Industrial Park)
 - 60' Right-of-Way (near CSX line, near Eastern Avenue)
 - 49' Right-of-Way (near CSX line, near O'Donnell Street)
 - 91' Right-of-Way (near the bottom left, near Canton Crossing)
- Local Infrastructure:**
 - Streets:** E. Lombard Street, Eastern Avenue, O'Donnell Street, and Haven Street are labeled.
 - Highways:** Interstate 895 and Interstate 95 are shown as major thoroughfares.
 - Industrial/Commercial Sites:** Crown Industrial Park, Bob's Transport Inc., Travel Plaza, and various other businesses are labeled.
 - Public Facilities:** The Hopkins Bayview Medical Center is located to the east.
- Other Features:** The map includes labels for 'Vacant' land, 'Vacant For Lease', and 'Vacant' areas. It also shows existing rail lines and various local landmarks.

TRACK OWNERS

Abandoned
 Inactive
 Active

Primary
 Secondary
 Local

Amtrak
 CSX
 Canton Railroad
 Norfolk Southern Railroad

C. STREET NETWORK

The extension of Red Line to Bayview Study Area has several street segments, which may be suitable for locating a section of the transit alignments. The major streets in the study area (see Figure 2.1) include the following:

- Eastern Avenue
- Lombard Street
- Boston Street
- O'Donnell Street
- Oldham Street
- Haven Street
- Ponca Street
- Kane Street

Of these streets Eastern Avenue and Lombard, Boston and O'Donnell Streets run east-west whereas Oldham, Haven, Ponca and Kane Streets run north to south. These roadway sections were evaluated for traffic, lane configurations, existing traffic signals, on-street parking and bus stops. On the basis of this analysis, the following conclusions were drawn regarding the comparative suitability of these roadway segments to the location of transit alignments. See Appendix C for detailed descriptions.

Eastern Avenue is the main commercial spine within the area. The commercial establishments vary from grocery stores, restaurants, bars and other service-related establishments. Lombard Street landuses are chiefly residential. Traffic in this area is characterized by cars and pedestrians. Any attempts to locate transit in Eastern Avenue and/or Lombard Street are likely to have severe adverse impacts to businesses, residences and on-street parking. This does not exclude these streets from being considered for transit alignments, however, the tradeoffs are significant and must be considered carefully. The uses in the general area around O'Donnell and Boston Streets are industrial in nature characterized by heavy truck traffic. This makes them unsuitable for transit alignments as it would come in conflict with truck traffic. Further, these industrial locations are not popular destinations as of today. However, this is likely to change in future with the entire Canton/Fells Point area poised for major redevelopment.

Haven and Ponca Streets have limited right-of-way which makes them unsuitable for transit vehicles. Oldham Street has sufficient width in the southern segment making it an option for a potential transit alignment. Kane Street connects to Dundalk Avenue making it suitable in the event of a potential extension of the Red Line to Dundalk and therefore may be considered for a possible transit alignment.

It appears that sections of Oldham and Kane Streets may be found appropriate for locating north-south transit alignments. No east-west streets were found suitable for locating transit alignments.

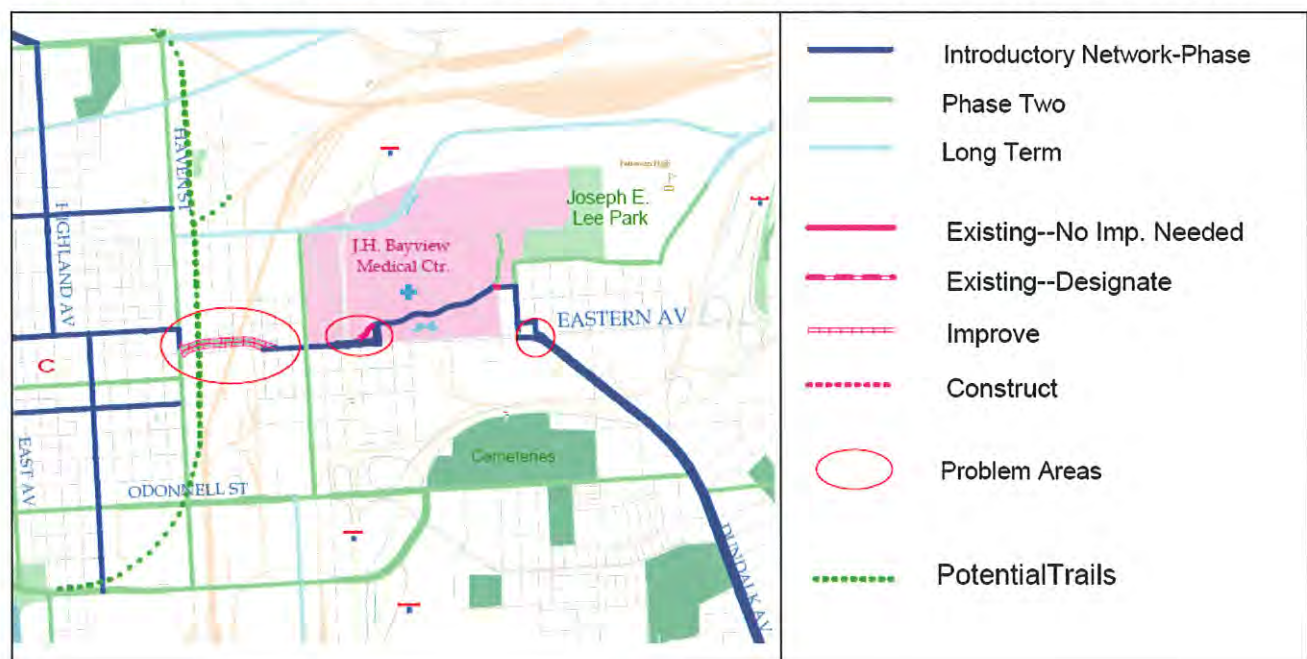
D. CITY OF BALTIMORE BICYCLE NETWORK

The City of Baltimore Bicycle Master Plan was prepared in 2006 by the Department of Transportation, in cooperation with the Department of Planning. The Plan highlights existing conditions and programs with regards to bicycle networks and facilities. The Bicycle Master Plan outlines the master planning process, identifies specific goals, objectives, recommended actions and performance measures and proposes improvements for the future along with funding priorities. The Bicycle Master Plan proposes an aggressive program of on-street bicycle transportation improvements that will create an Introductory Network of bicycle facilities, see Figure 2.4 showing a portion of the bicycle network in the study area (the complete Bicycle Network Plan is included in Appendix C). The Introductory Network comprises several tiers based on priority of implementation.

There are several street segments within the Red Line Extension to Bayview Study Area that are included in the Bicycle Master Plan's list of facilities that require improvements within Tiers One, Two and Three. These include sections of Eastern Avenue, Aliceanna Street, Dundalk Avenue, Mason Lord Drive, Lombard Street, O'Donnell Street, Boston Street, Haven Street and Ponca Street. The Bicycle Master Plan also identifies problem areas, i.e. intersections that need improvements, which include the following:

- Eastern Avenue – Dundalk Avenue – Cornwall Street – Drew Street
- Eastern Avenue – I-895 – Mason Lord Drive
- Eastern Avenue – Haven Street – Lehigh Street

FIGURE 2.4: CITY OF BALTIMORE BICYCLE NETWORK SHOWING STUDY AREA



Some of these proposed plan improvements may come in conflict with the potential alignment alternatives discussed in the Feasibility Study. Generally, if an alignment has impacts to traffic, it may also impact bicycle facilities on that street. It is suggested that the detailed analyses include impacts to existing and proposed bicycle facilities. Further, station locations in the vicinity of existing and proposed bicycle routes, shared lanes and trails should aim to make transit attractive

for bicycle riders by providing bicycle stands and lockers wherever feasible. It is suggested that detailed design of station areas recognize and respond to the presence of bicycle facilities and users.

The Bicycle Master Plan also includes the proposed East Baltimore Rail Trail (N-S Trail, East of Haven Street) from Monument Street to Boston Street. This trail would run on the inactive Norfolk-Southern/Canton Railroad right-of-way. Several potential alignments in the study area would use part or all of that same inactive Norfolk-Southern/Canton Railroad right-of-way. This right-of-way is not wide enough to maintain the FRA-mandated 25-foot horizontal separation between the transitway and an active railroad track. Therefore the transit operating plan will have to incorporate separation of freight and transit uses by time. The right-of-way varies between 66' and 82' in width. This is wide enough to accommodate the transitway and the proposed trail with a suitable buffer between the two. It is recommended that the detailed design be coordinated so as to take into consideration the width of the potential trail and suitable buffers between the transitway and the trail.

E. MAJOR UTILITIES

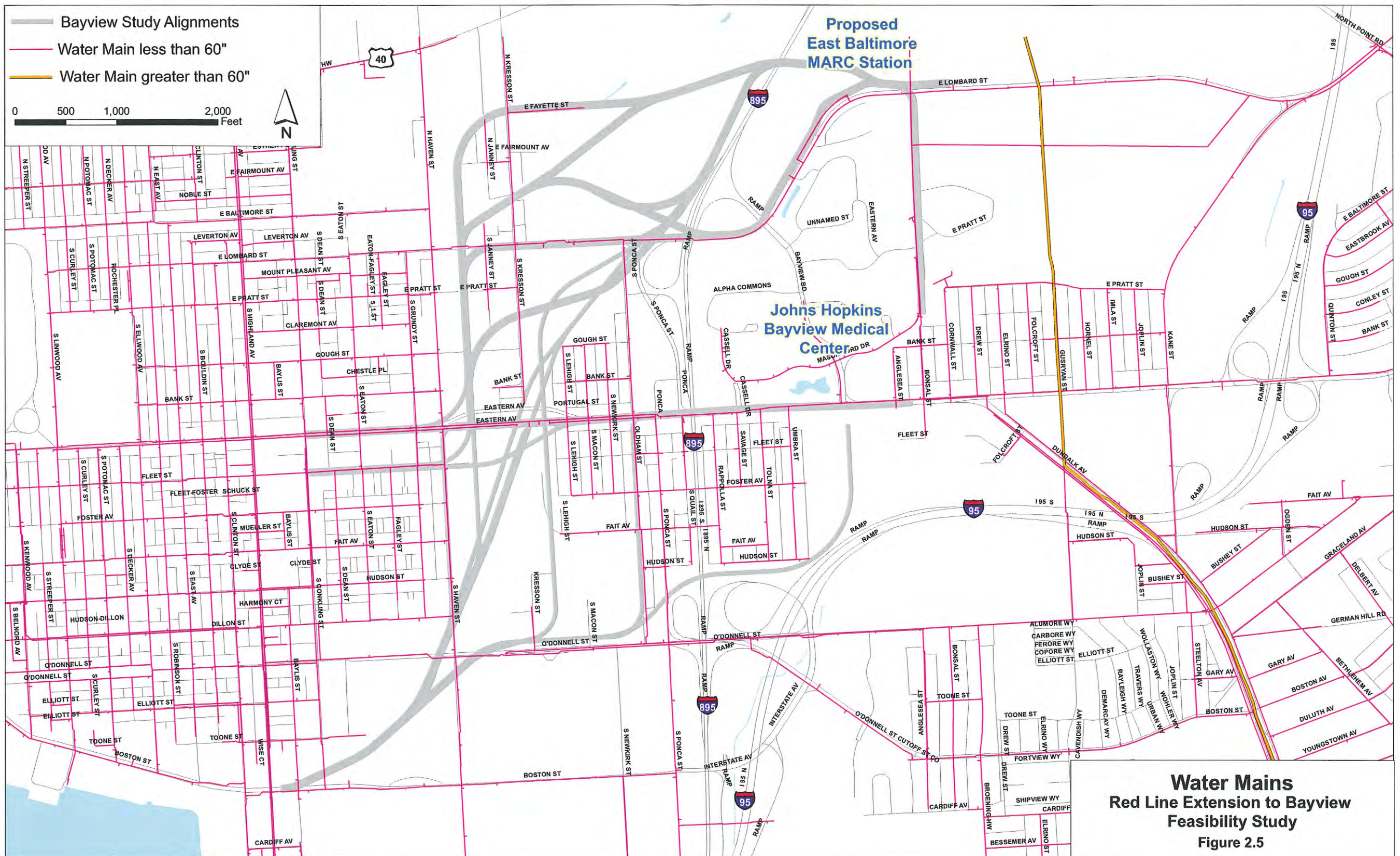
The Red Line Extension to Bayview Feasibility Study analyzed the following major utilities in the study area. See figures 2.5 through 2.7.

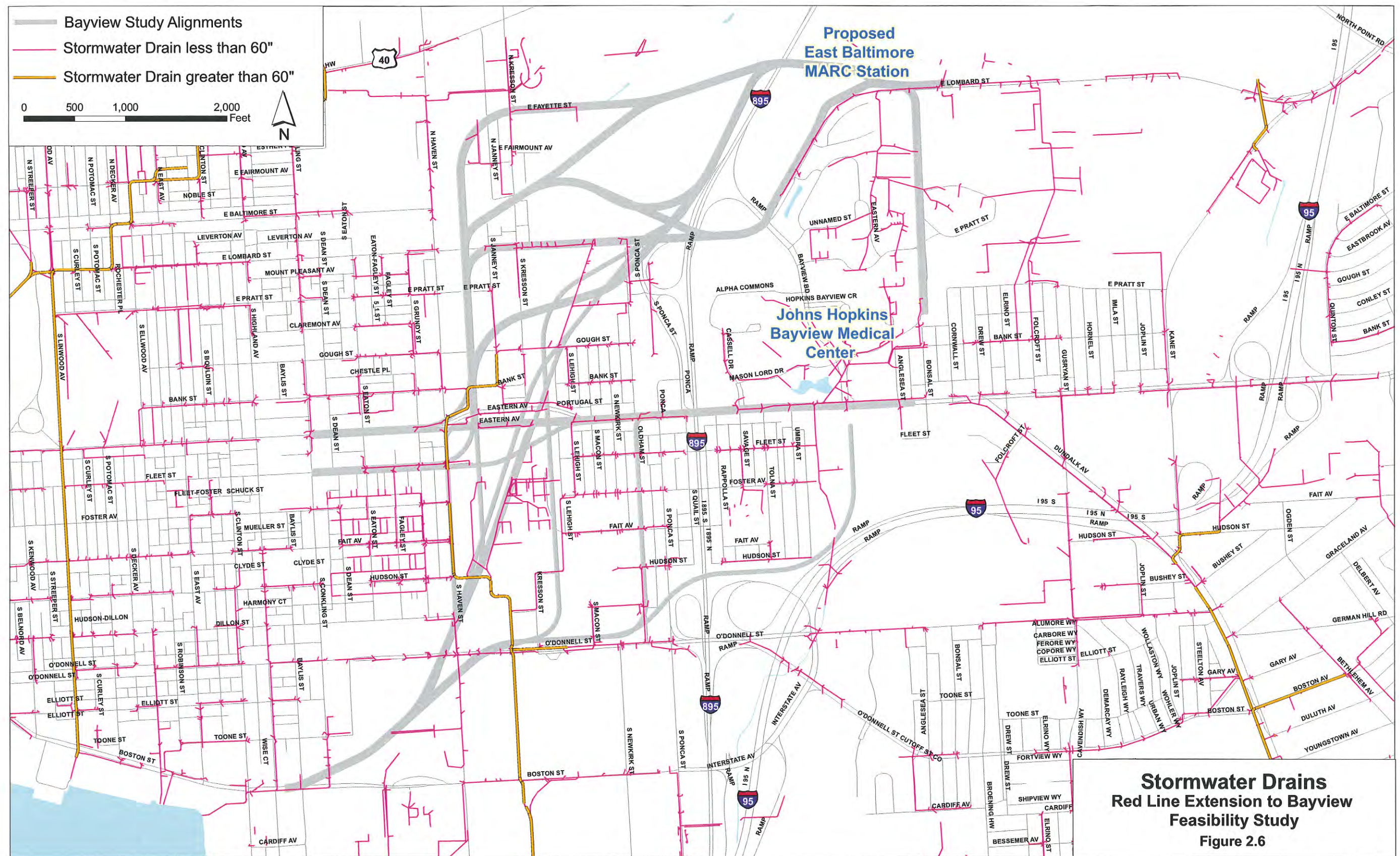
- Water Mains
- Stormwater Drains
- Wastewater Drains

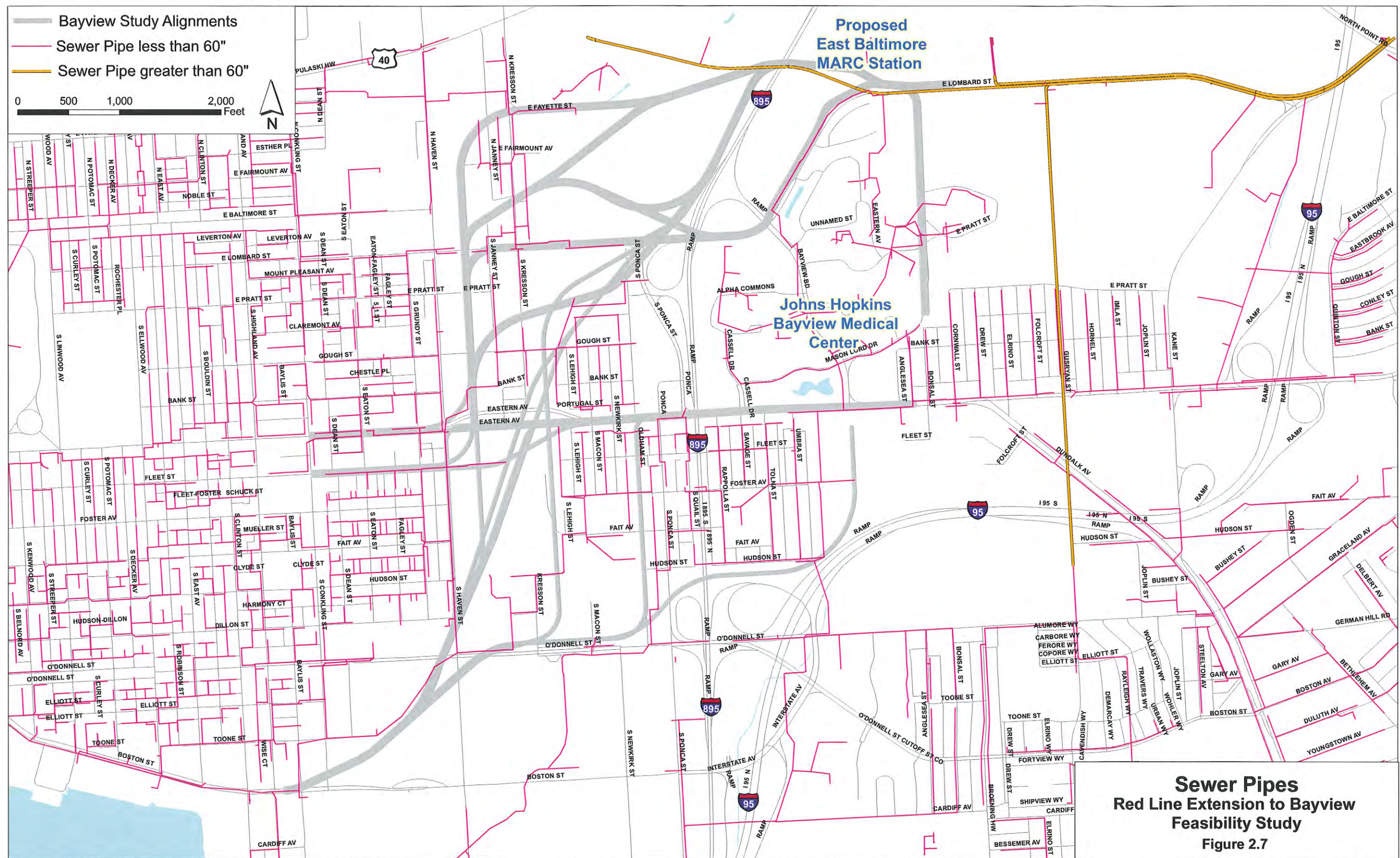
There are two categories of facilities for each of these major utilities - less than 60" in diameter and larger than 60" in diameter. Refer to Appendix C for the utility maps. Generally, in places where the utility drains and/or pipes are smaller than 60" in diameter, they pose no significant challenge to the location of the transitway. The utility drains and/or pipes that are larger than 60" in diameter may pose a challenge only in the case of tunnel sections. In two locations, for three alignment alternatives, storm water drains larger than 60" in diameter cross tunnel sections. These alignments are as follows:

- Pemco Alignment
- Oldham Alignment
- Crown West Alignment

In all these cases, the alignments will descend into a tunnel prior to the point of conflict thereby going under the utility line. It appears there will be no significant challenge to locating the transit alignments as discussed. However, all alignment alternatives that will be selected for further analyses will go through a design process to ensure that challenges and conflicts are addressed to ensure that the adverse impacts to the utility lines can be avoided or mitigated.







III. POTENTIAL ALIGNMENTS AND STATIONS

1. INTRODUCTION

The alignment alternatives developed for the Red Line Extension to Bayview Feasibility Study build upon the routes and destinations developed as a part of the ongoing Red Line Corridor Transit Study. The ongoing Red Line Corridor Transit Study is considering two sets of alignment alternatives for terminating the line in East Baltimore. The first set of alignments follows Eastern Avenue and Fleet Street using this pair of streets as a couplet with the eastbound track or lane following Fleet Street and the westbound track or lane following Eastern Avenue. These alignments would terminate at either Conkling Street or Haven Street using those streets as a connection for a turn back loop. The use of Eastern Avenue and Fleet Street as a couplet will reduce impacts to traffic capacity and residential neighborhoods during construction and operation. This Eastern-Fleet alternative could be either light rail transit (LRT) or bus rapid transit (BRT) and could be either a surface or a tunnel alternative. The second set of alignments follows Boston Street to a termination in the vicinity of the Canton Crossing and Brewers Hill developments at Clinton Street or Conkling Street. A BRT alternative with a termination at Conkling Street offers the opportunity to serve the Highlandtown business district by extending the line up Conkling Street to a termination at Eastern Avenue.

The alignment alternatives which could connect the Eastern/Fleet and Boston Street alignments with the Eastern Avenue and the proposed East Baltimore MARC Station destinations can be classified into four basic alignment groups. Figure 3.0 shows these alignment groups:

1. Boston Street – Eastern Avenue
2. Boston Street – East Baltimore MARC Station
3. Eastern/Fleet – Eastern Avenue
4. Eastern/Fleet – East Baltimore MARC Station

The general characteristics of the alignments within each group are briefly discussed here.

1. Boston Street – Eastern Avenue

This group of alignments begins at Boston and Conkling Streets and connects to the Bayview Medical Center on Eastern Avenue or at the Pemco site. There are four alignments in this group depicted by yellow lines on Figure 3.0. They are as follows:

1. Pemco Alignment
2. Oldham Alignment
3. Greektown Alignment
4. Haven Alignment

All these alignments have a proposed Bayview South Station in close proximity to the Pemco site offering opportunities for industrial redevelopment. These alignments have a second station at Greektown or Highlandtown. Direct access to the heart of the Bayview Medical Center is not provided. None of these alignments provide an access to the proposed East Baltimore MARC Station. Three of these alignment alternatives have tunnel sections whereas one of them has an

aerial section. Most of them have challenging construction aspects associated with them and three out of four have a high potential for encountering subsurface contaminated soils and groundwater. Traffic impacts and impacts to business operations and to residences vary upon the actual location of the transitway. In general, any transit on Eastern Avenue results in adverse impacts to traffic and business operations.

2. Boston Street – East Baltimore MARC Station

This group of alignments begins at Boston and Conkling Streets and connects to the proposed East Baltimore MARC Station. All these alignments (with the exception of the Kresson C Alignment from Boston Street) terminate in the heart of the Bayview Medical Center. There are nine alignment alternatives in this group depicted by pink lines on Figure 3.0. They are as follows:

5. Crown East Alignment
6. Crown West Alignment
7. Canton Railroad Alignment
8. Central Alignment from Boston Street
9. Lombard Alignment from Boston Street
10. Kresson A Alignment from Boston Street
11. Kresson B Alignment from Boston Street
12. Kresson C Alignment from Boston Street
13. Northern Alignment from Boston Street

All these nine alignments provide excellent connectivity to the proposed East Baltimore MARC Station and to the Bayview Medical Center with the exception of one alignment. Most of these alignments use the NS/Canton Railroad or the Norfolk-Southern right-of-way for a part of the alignment. One alternative uses the abandoned CSX tracks. Two of the nine alignments have tunnel sections. Most of these alignments have no major challenges with regards to constructability with the exception of the 'Lombard Alignment from Boston Street' which poses significant construction challenges.

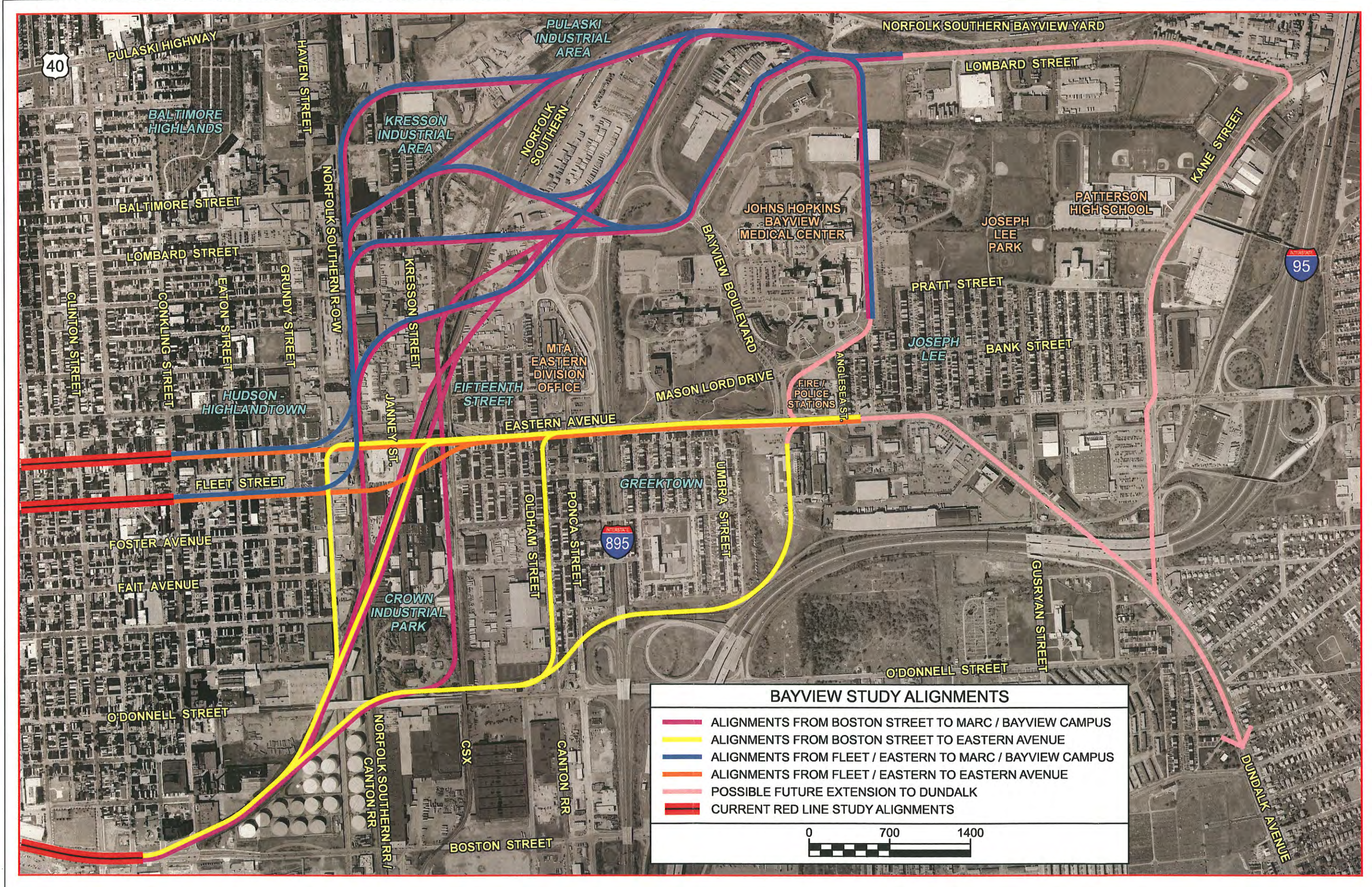
3. Eastern/Fleet – Eastern Avenue

There is only one alignment in this group depicted by orange lines in the Figure 3.0.

14. Eastern-Fleet Alignment

This is the shortest and most straightforward connection to Bayview. However, it does not connect to the proposed East Baltimore MARC Station and provides no stations that could serve the neighborhoods in the area. This alignment would require a tunnel to avoid traffic impacts to the Eastern Avenue. The tunnel construction would pose significant challenges to construction and has a very high potential to encounter subsurface contaminated soils and groundwater.

Figure 3.0: RED LINE EXTENSION TO BAYVIEW – ALL ALIGNMENTS



4. Eastern/Fleet – East Baltimore MARC Station

This group of alignments begins at Eastern Avenue-Fleet Street and connects to the proposed East Baltimore MARC Station. All these alignments (with the exception of the 'Kresson C Alignment from Eastern-Fleet') terminate in the heart of the Bayview Medical Center. There are six alignment alternatives in this group depicted by blue lines on Figure 3.0. They are as follows:

15. Central Alignment from Eastern-Fleet
16. Lombard Alignment from Eastern-Fleet
17. Kresson A Alignment from Eastern-Fleet
18. Kresson B Alignment from Eastern-Fleet
19. Kresson C Alignment from Eastern-Fleet
20. Northern Alignment from Eastern-Fleet

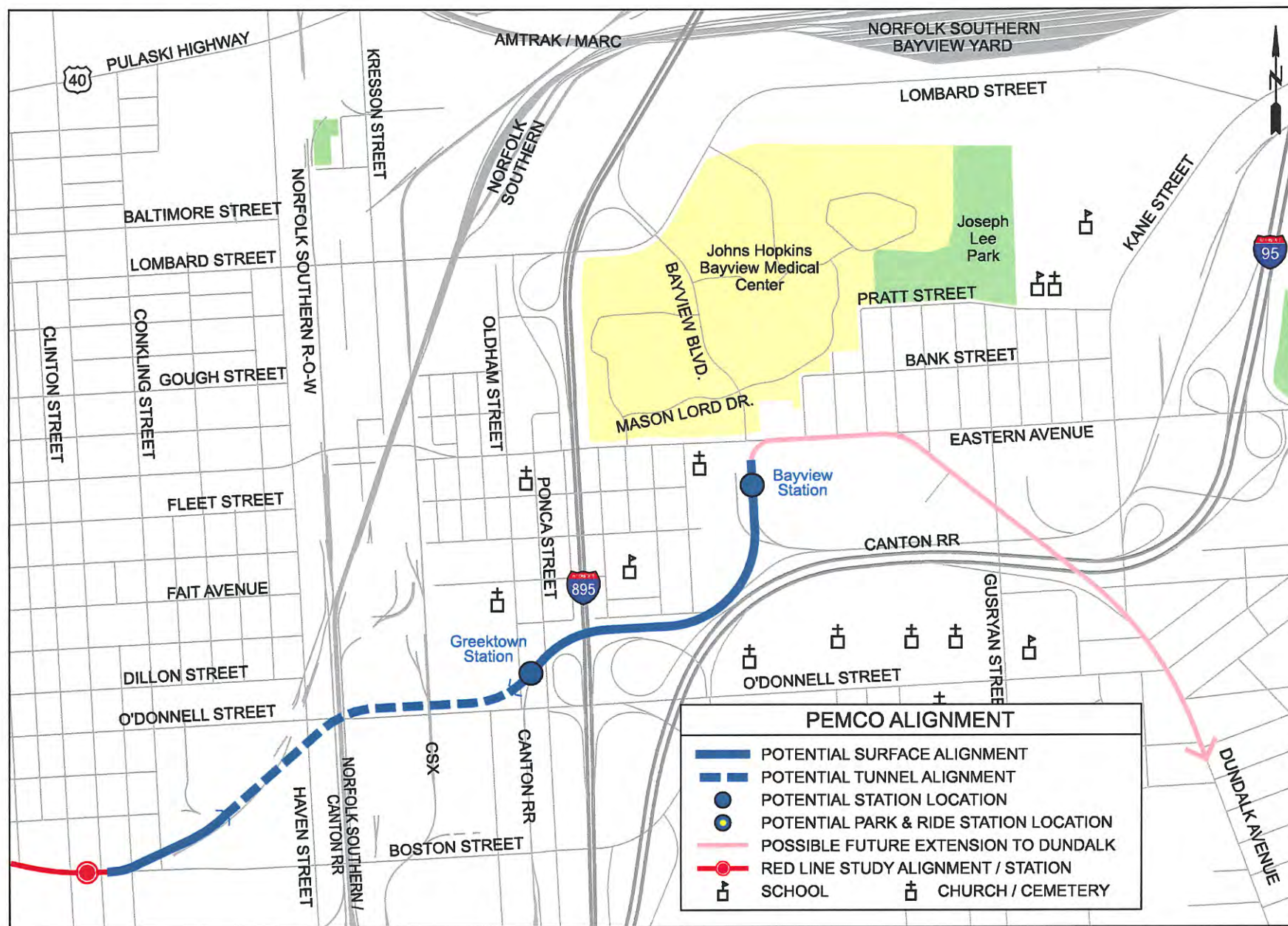
These six alignments provide excellent connectivity to the proposed East Baltimore MARC Station and to the Bayview Medical Center with the exception of one alignment. These alignments do not provide station opportunities that could serve the neighborhoods in the area. All these alignments use the NS/Canton Railroad right-of-way for a part of the alignment. None of these alignments have tunnel sections; however, most of them have aerial sections. Most of these alignments have no major challenges with regards to constructability. All these alignments are likely to have significant adverse impacts to traffic, particularly on Eastern Avenue. Contamination concerns for these alignments vary from none to low with the exception of the 'Northern Alignment from Eastern-Fleet' which has high contamination concerns.

2. ALIGNMENT ALTERNATIVES

This section describes all the alignment alternatives in detail. The description includes the route of the alternative from either Boston Street or the Eastern Avenue - Fleet Street couplet terminating in a station near Bayview and how the alignment may be extended to Dundalk in the future. The stations may differ from one alternative to another. In cases when different alignments have a station with same name, the exact location of the station may vary from one alternative to another. The discussion includes brief station information for each alternative. The detailed description of stations is provided under the section "POTENTIAL STATIONS" within the same chapter. The analysis of the alignments includes a brief discussion of the opportunities and impacts of each alignment with regards to the following criteria:

- *Access to Bayview*
- *Connection to the proposed East Baltimore MARC Station*
- *Property Impacts*
- *Economic Development Opportunities*
- *Compatibility with Rail Freight Operations*
- *Impacts to Residences and Parking*
- *Impacts to Business Operations*
- *Traffic Impacts*
- *Environmental/Contamination Concerns*
- *Constructability*

Figure 3.1: PEMCO ALIGNMENT



PEMCO ALIGNMENT

Description

Beginning at Boston and Conkling Streets, the transitway would follow the abandoned railroad right-of-way on the surface for approximately 400 feet before descending into a tunnel that would cross under the Canton and NS Railroads rights-of-way as well as the O'Donnell Street Viaduct. The tunnel portion would curve to the east to allow the transitway to follow the north side of O'Donnell Street. The line would ascend to the surface between the existing Cambridge Iron & Metal scrap yard and Oldham Street. In this section another short tunnel would be required to cross under the CSXT right-of-way, and two entrance roads to businesses would have to be relocated and/or combined as a single road. At Oldham Street, the transitway would cross the street at grade and follow an alignment that would bring it to the north side of the single-track Canton Railroad right-of-way. From this point the transitway would remain on the surface and would follow the north side of the Canton Railroad right-of-way to the Pemco property. At the Pemco property the alignment would turn north and cross the property to enter Eastern Avenue at a point approximately opposite Bayview Boulevard. A future extension to Dundalk could be accommodated by continuing the transitway in Eastern Avenue and turning south onto Dundalk Avenue.

Stations (Greektown and Bayview)

This alignment offers opportunities for stations at Oldham Street, and on the Pemco property prior to where the transitway would enter Eastern Avenue.

Analysis

Access to Bayview

This alignment does not provide direct access to the Bayview Medical Center. Access to the heart of the Bayview Medical Center would require a walk of slightly more than a quarter of a mile or the implementation of a shuttle service.

Connection to the proposed East Baltimore MARC Station

This alignment does not provide direct access to the proposed East Baltimore MARC Station. A shuttle service will be required to access the station.

Property Impacts

This alignment would require the acquisition and demolition of a group of four homes, a gas station, and a United Auto Workers hall. This alignment would also require the acquisition and demolition of a business on the east side of Oldham Street.

Economic Development Opportunities

A station on Oldham Street would serve the proposed Greektown Hale-KSI development project. This alignment would cross the Pemco site which was identified by the City as having redevelopment potential for new industrial uses.

Compatibility with Rail Freight Operations

This alternative will impact Pemco site's access to rail freight operations.

Impacts to Residences and Parking

There are no impacts to residences and/or parking.

Impacts to Business Operations

There are no impacts to business operations.

Traffic Impacts

This alignment has a grade crossing at Oldham and Ponca Streets. The impacts would be minimal.

Environmental/Contamination Concerns

The tunnel section of the alignment has the greatest potential to encounter subsurface contaminated soils and groundwater.

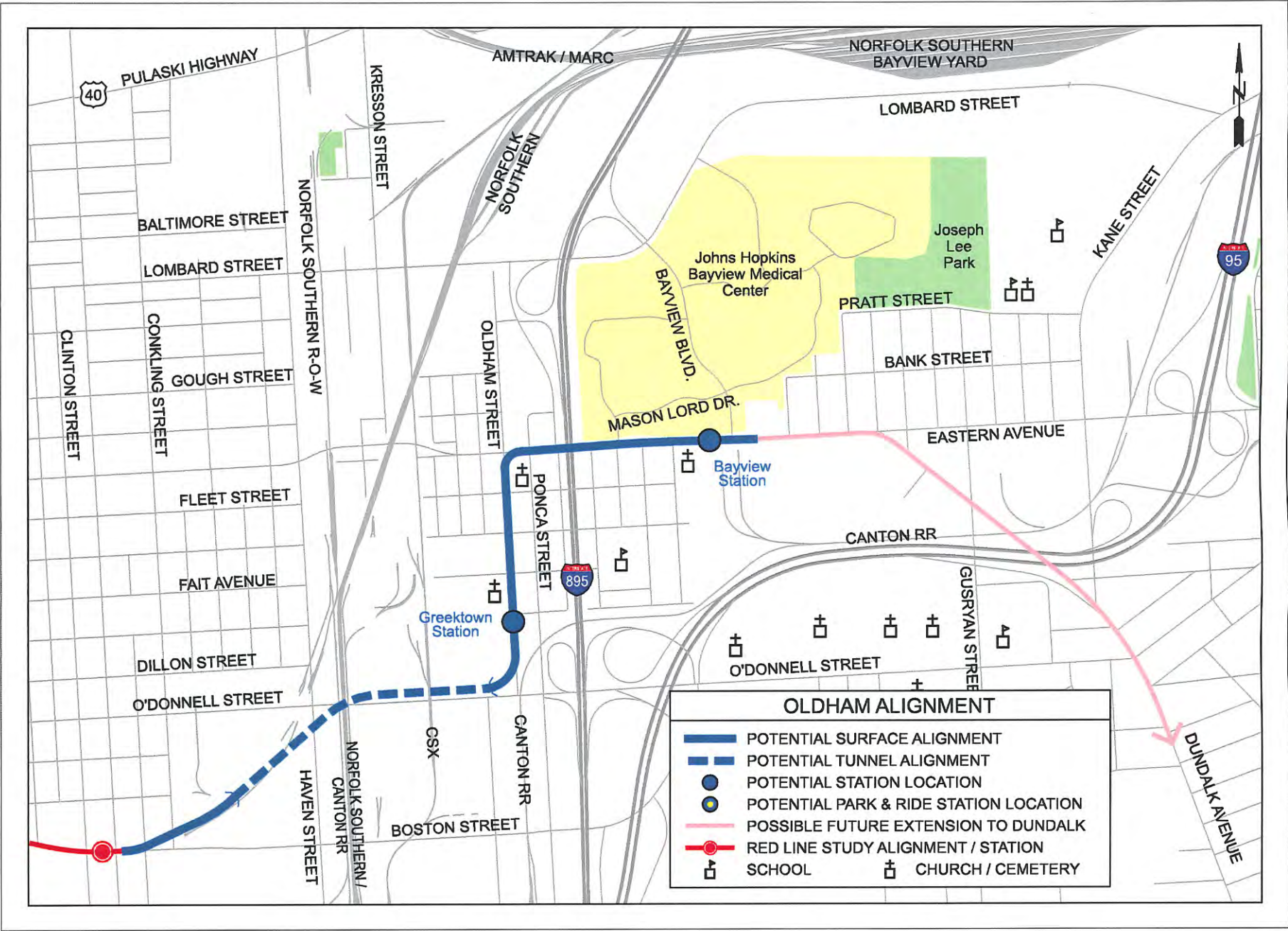
Constructability

This alignment may require the reconstruction of the Ponca Street and I-895 overhead bridges that currently cross the Canton Railroad right-of-way. The presence of pile-supported piers at the O'Donnell Street Viaduct and the need for a second short tunnel under the CSXT right-of-way would present some construction challenges. The surface construction on the majority of this alignment poses no challenges.

Special Concerns

Pemco site is an important industrial redevelopment property within the City, particularly because of its freight rail connection to the Canton Railroad line and proximity to Interstates 95 and 895. The need to take this prime industrial property without achieving significant advantages over the other alignments is enough to warrant a recommendation for early elimination.

Figure 3.2: OLDDHAM ALIGNMENT



OLDHAM ALIGNMENT

Description

This alternative follows the same alignment as the previous Pemco Alignment up to Oldham Street. At Oldham Street, the transitway would turn northward and be located on the surface in Oldham Street. It would follow Oldham Street to Eastern Avenue where it would turn eastward and be located in Eastern Avenue as it passes Bayview Boulevard. A future extension to Dundalk could be accommodated by continuing the transitway in Eastern Avenue and turning south onto Dundalk Avenue.

Stations (Greektown and Bayview)

This alignment offers opportunities for stations at Oldham Street, and on Eastern Avenue just west of Bayview Boulevard.

Analysis

Access to Bayview

This alignment does not provide on-site access to the Bayview Medical Center. Access to the heart of the Bayview Medical Center would require a walk of slightly more than a quarter of a mile or the implementation of a shuttle service.

Connection to the proposed East Baltimore MARC Station

This alignment does not provide direct access to proposed East Baltimore MARC Station. A shuttle service will be required to access the station.

Property Impacts

This alignment would require the acquisition and demolition of a group of four homes, a gas station, and a United Auto Workers hall. This alignment would also require the acquisition and demolition of a business on the southeast corner of Oldham Street and Eastern Avenue and homes and businesses at the corner of Oldham and O'Donnell Streets. Some reservation for a right-of-way across the Pemco property should be negotiated with the developer to ensure that space will be provided for the transitway.

Economic Development Opportunities

A station on Oldham Street would serve the proposed Greektown Hale-KSI development project. This alignment would cross the Pemco site which was identified by the City as having redevelopment potential for new industrial uses.

Compatibility with Rail Freight Operations

This alternative may impact Pemco site's access to rail freight operations.

Impacts to Residences and Parking

There will be impacts to residences and parking along Oldham Street and Eastern Avenue.

Impacts to Business Operations

There will be impacts to business operations along Oldham Street and Eastern Avenue.

Traffic Impacts

The alignment is located at grade in the Oldham Street right-of-way which is a part of the residential Greektown neighborhood. The construction of the transitway would likely have both temporary and permanent impacts to travel and parking on that street. This alignment will also have adverse impacts to traffic along Eastern Avenue.

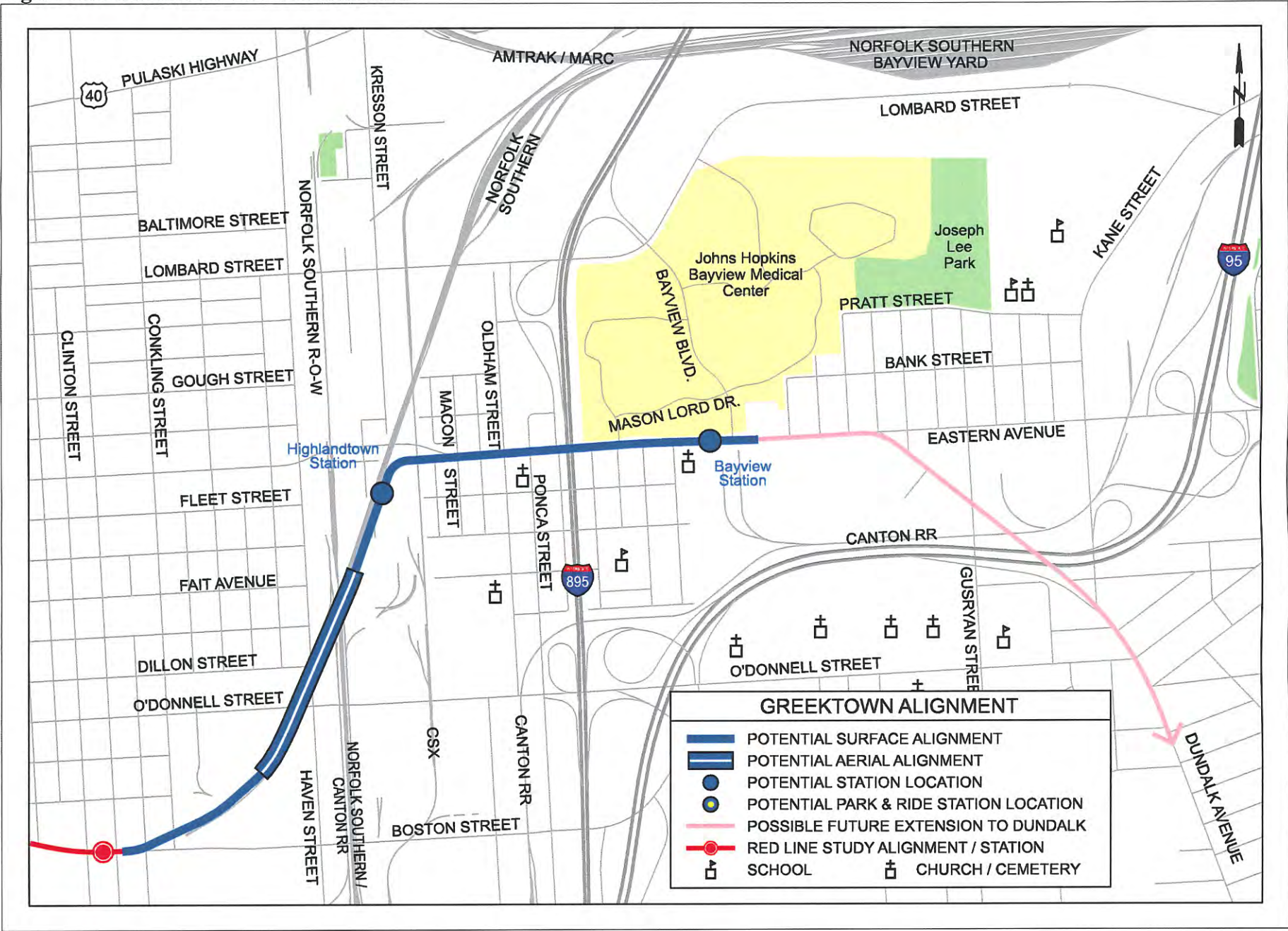
Environmental/Contamination Concerns

The tunnel section of the alignment has the greatest potential to encounter subsurface contaminated soils and groundwater.

Constructability

The presence of pile-supported piers at the O'Donnell Street Viaduct and the need for a second short tunnel under the CSXT right-of-way would present some construction challenges on this alignment for the tunnel option, while the height of the viaduct would present a different set of challenges for the aerial structure option.

Figure 3.3: GREEKTOWN ALIGNMENT



GREEKTOWN ALIGNMENT

Description

Beginning at Boston and Conkling Streets, the transitway would follow the abandoned railroad right-of-way on the surface for approximately 700 feet. From that point it would ascend on an aerial structure to cross over the O'Donnell Street Viaduct and Canton and NS Railroads rights-of-way and descend to the surface on the west side of the Crown Industrial Park. At the north end of the Crown Industrial Park the line would turn eastward on the original alignment of Eastern Avenue and continue east, crossing under the CSXT right-of-way at an existing bridge and meeting Eastern Avenue at its intersection with Macon Street. From Macon Street and Eastern Avenue the transitway would be located on the surface in Eastern Avenue as it passes Bayview Boulevard. A future extension to Dundalk could be accommodated by continuing the transitway in Eastern Avenue and turning south onto Dundalk Avenue.

Stations (Highlandtown and Bayview)

This alignment offers opportunities for stations at the north end of the existing Crown Industrial Park, and at the intersection of Eastern Avenue and Bayview Boulevard.

Analysis

Access to Bayview

This alignment does not provide on-site access to the Bayview Medical Center. Access to the heart of the Bayview Medical Center would require a walk of slightly more than a quarter of a mile or the implementation of a shuttle service.

Connection to the proposed East Baltimore MARC Station

This alignment does not provide direct access to the proposed East Baltimore MARC Station. A shuttle service will be required to access the station.

Property Impacts

This alignment would require the acquisition of a right-of-way as well as acquisition and demolition of buildings, or parts of buildings, within the Crown Industrial Park. This alignment would also require the acquisition and demolition of the building at the northernmost end of the Crown Industrial Park.

Economic Development Opportunities

A station at the northern end of Crown Industrial Park would provide redevelopment opportunities. This alignment would cross the Pemco site which was identified by the City as having redevelopment potential for new industrial uses.

Compatibility with Rail Freight Operations

This alternative may impact Pemco site's access to rail freight operations.

Impacts to Residences and Parking

This alignment would have impacts to residences and parking along Eastern Avenue.

Impacts to Business Operations

This alignment would have impacts to business operations along Eastern Avenue.

Traffic Impacts

This alignment alternative has transit at grade on Eastern Avenue between Macon and Ponca Streets. This would have severe adverse impacts to the traffic on Eastern Avenue.

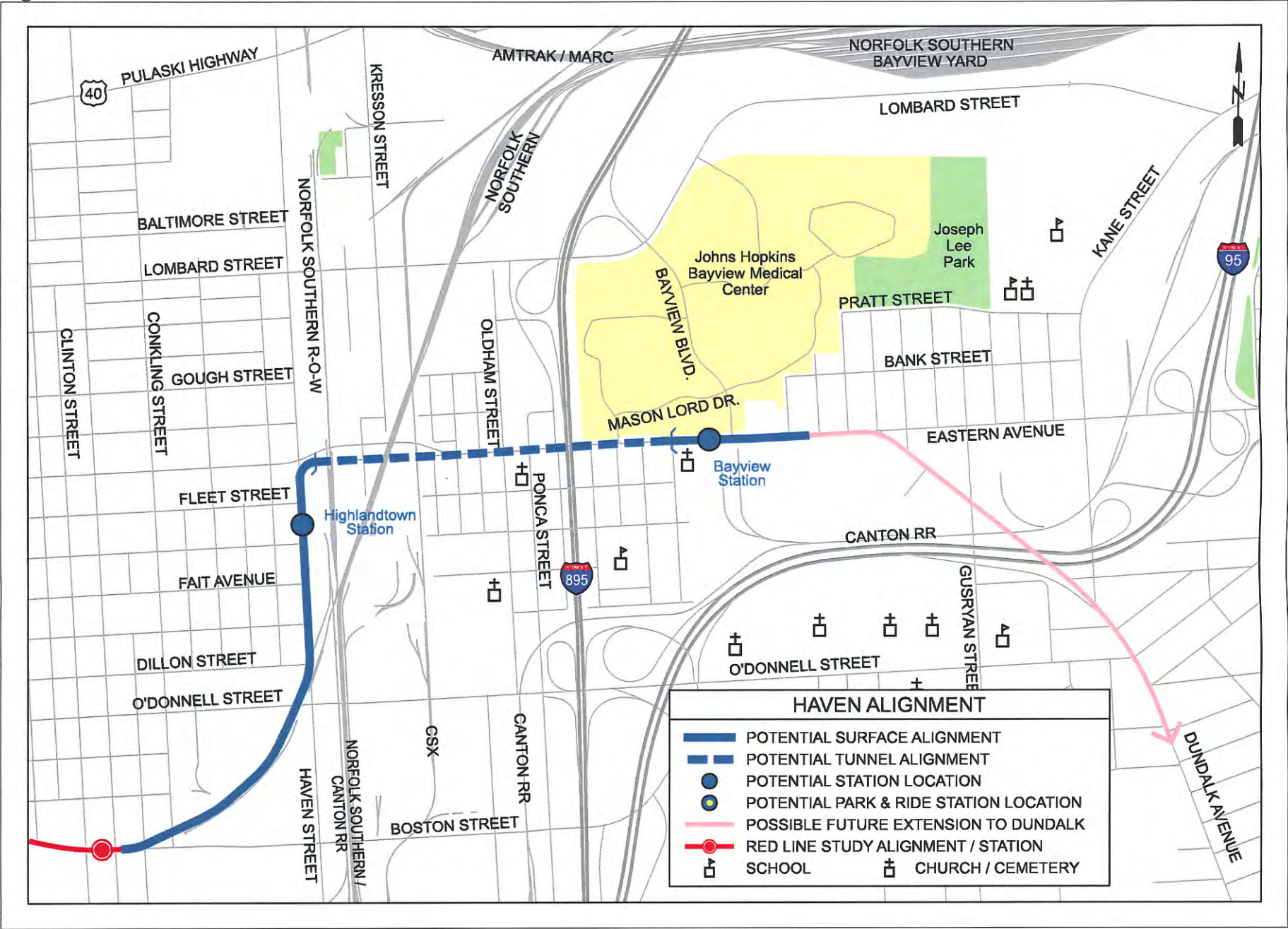
Environmental/Contamination Concerns

There is a low potential for contamination with this alignment.

Constructability

This alignment would require the reconstruction of the existing bridge carrying CSXT's track over what is currently an entrance to the Crown Industrial Park.

Figure 3.4: HAVEN ALIGNMENT



HAVEN ALIGNMENT

Description

Beginning at Boston and Conkling Streets, the transitway would follow the abandoned railroad right-of-way on the surface, under the O'Donnell Street Viaduct, and onto Haven Street. At Haven Street it would turn north and remain in the street until it reaches a point south of Eastern Avenue. It would then turn eastward on the original alignment of Eastern Avenue and descend into a tunnel crossing as it did so under the NS right-of-way (currently out of service) located approximately 300 feet east of Haven Street. The tunnel would pass under I-895. The transitway would remain in the tunnel until it returned to the surface in Eastern Avenue near Bayview Boulevard. A future extension to Dundalk could be accommodated by continuing the transitway in Eastern Avenue and turning south onto Dundalk Avenue.

Stations (Highlandtown and Bayview)

This alignment offers opportunities for stations along Haven Street between O'Donnell Street and Eastern Avenue, and at the intersection of Eastern Avenue and Bayview Boulevard.

Analysis

Access to Bayview

This alignment does not provide on-site access to the Bayview Medical Center. Access to the heart of the Bayview Medical Center would require a walk of slightly more than a quarter of a mile or the implementation of a shuttle service.

Connection to the proposed East Baltimore MARC Station

This alignment does not provide direct access to the proposed East Baltimore MARC Station. A shuttle service will be required to access the station.

Property Impacts

To accommodate the curve from Haven Street onto the original alignment of Eastern Avenue, a body shop property on the southeast corner will have to be acquired.

Economic Development Opportunities

A station at the northern end of Crown Industrial Park would provide redevelopment opportunities. This alignment would cross the Pemco site which was identified by the City as having redevelopment potential for new industrial uses.

Compatibility with Rail Freight Operations

This alternative may impact Pemco site's access to rail freight operations.

Impacts to Residences and Parking

This alignment would have minimal impacts to residences and parking along Haven Street.

Impacts to Business Operations

This alignment would have minimal impacts to business operations along Haven Street.

Traffic Impacts

Transit at grade in Haven Street will have some traffic impacts. Since the properties fronting Haven Street are largely industrial and commercial, and the street right-of-way is over 50 feet wide these impacts will be minimal.

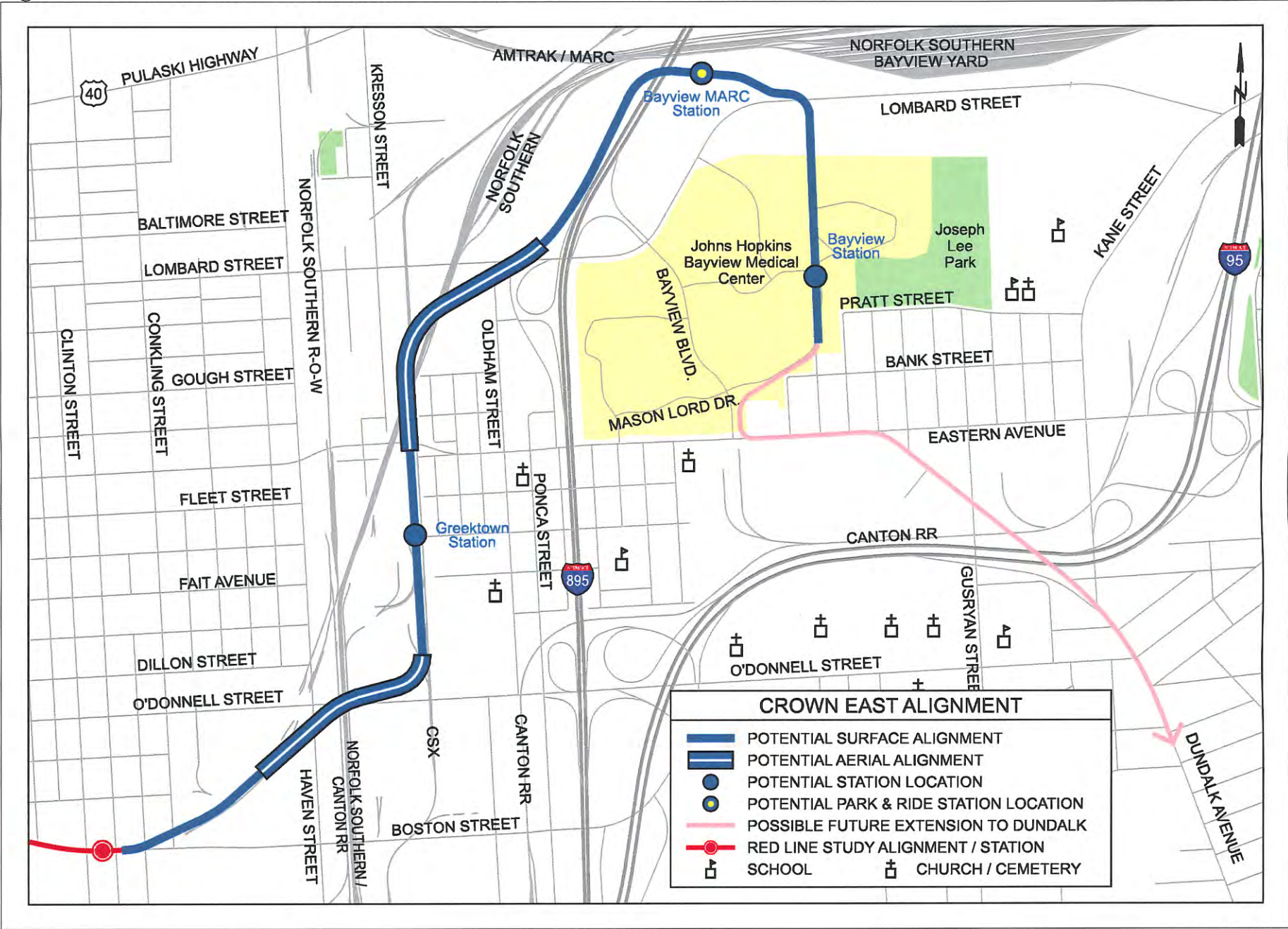
Environmental/Contamination Concerns

The tunnel section of the alignment has the greatest potential to encounter subsurface contaminated soils and groundwater.

Constructability

This alignment will require the construction of a railroad bridge to carry the inactive NS tracks and right-of-way over the transitway. To provide adequate vertical clearance under the inactive NS right-of-way, as well as adequate vertical clearance for a tunnel under the I-895 corridor, the approaches to both ends of the tunnel will require grades of 8.0%.

Figure 3.5: CROWN EAST ALIGNMENT



CROWN EAST ALIGNMENT

Description

Beginning at Boston and Conkling Streets, the transitway would follow the abandoned railroad right-of-way on the surface for approximately 300 feet before ascending onto an aerial structure that would cross over the Canton and NS Railroads rights-of-way as well as the O'Donnell Street Viaduct. The structure would curve to the east to allow the transitway to cross the southeast corner of the Cambridge Iron & Metal site, then would turn north to follow the west side of the CSXT right-of-way. The transitway comes to the surface at the south end of the existing Crown Industrial Park. From there the transitway would remain on the surface following the west side of the CSXT right-of-way to Eastern Avenue where it would ascend on an aerial structure to carry it over the NS right-of-way twice, the CSXT right-of-way, a trucking company property, the north end of Oldham Street, and Lombard Street. The aerial ends on the slope on the west side of the I-895 right-of-way. At this point, the transitway would cross under I-895 to a potential park-and-ride lot near the proposed East Baltimore MARC Station. From the proposed East Baltimore MARC station, the transitway continues at-grade, crossing Lombard Street onto the Bayview Medical Center and a proposed extension of Mason Lord Drive. A future extension to Dundalk could be accommodated. The transitway would continue at-grade to Bayview Boulevard, turning east on Eastern Avenue and then turning south onto Dundalk Avenue.

Stations (Greektown, Bayview MARC and Bayview)

This alignment offers opportunities for stations at the north end of the existing Crown Industrial Park, on the aerial structure at the point where it crosses the north end of Oldham Street, nears the proposed East Baltimore MARC station, and at the Bayview Medical Center. A conceptual plan of the park-and-ride lot at Bayview MARC station is contained in Appendix A, Page 104.

Analysis

Access to Bayview

This alignment provides direct access to the heart of the Bayview Medical Center.

Connection to the proposed East Baltimore MARC Station

This alignment provides direct access to the proposed East Baltimore MARC Station.

Property Impacts

Rights-of-way will have to be acquired to cross the Cambridge Iron & Metal and Crown Industrial Park properties, and some building demolition will be required on the Crown Industrial Park property. Some property acquisition and demolition of existing businesses may be required west of the NS right-of-way north of Eastern Avenue. The Servu Trucking Co. property at Lombard and Oldham Streets will need to be acquired and the building on that site demolished. A right-of-way will also have to be acquired across the southeast corner of the NS intermodal facility north of Lombard Street and west of I-895.

Economic Development Opportunities

This alignment provides a station near the Crown Industrial Park which was identified as having redevelopment potential by the City.

Compatibility with Rail Freight Operations

The alignment does not require any coordination with rail freight operations. The I-895 right-of-way is sufficiently wide to accommodate the transitway but would require coordination with the Maryland Transportation Authority.

Impacts to Residences and Parking

This alignment would have minimal impacts to residences and parking along Eastern Avenue.

Impacts to Business Operations

This alignment would have minimal impacts to business operations along Eastern Avenue.

Traffic Impacts

This alignment crosses Eastern Avenue at grade. The impacts will be minimal.

Environmental/Contamination Concerns

There is a low potential for contamination with this alignment.

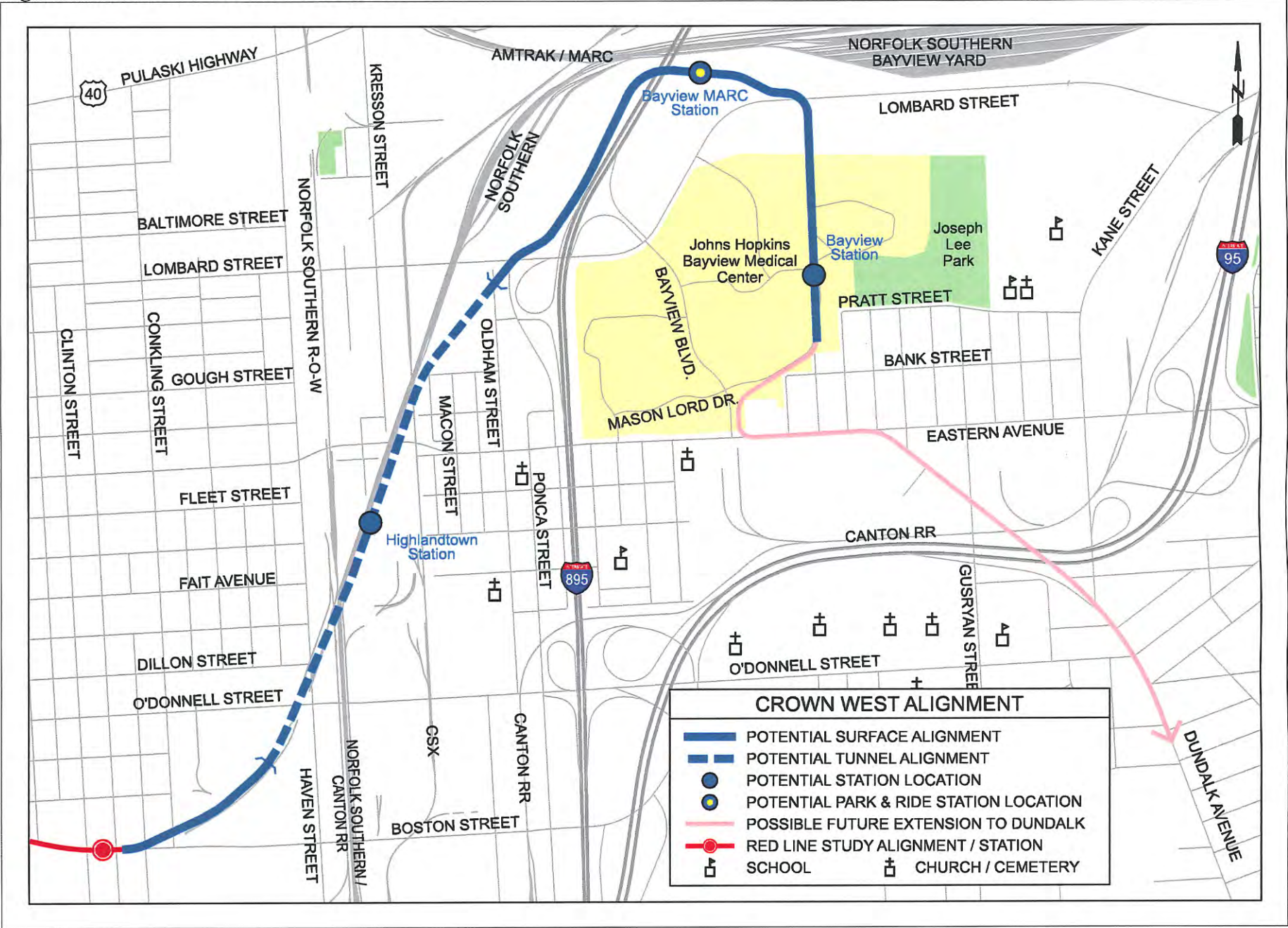
Constructability

The aerial structure over the Canton and NS Railroads rights-of-way as well as the O'Donnell Street Viaduct offers the advantages of flatter grades and avoidance of the pilings supporting the piers of the O'Donnell Street Viaduct.

Special Concerns

This alignment has an aerial structure through a proposed development at North Greektown. This may require reconsideration of the alignment or coordination with the proposed development.

Figure 3.6: CROWN WEST ALIGNMENT



CROWN WEST ALIGNMENT

Description

Beginning at Boston and Conkling Streets, the transitway would follow the abandoned railroad right-of-way on the surface for approximately 400 feet before descending into a tunnel that would cross under all railroads, streets and properties before returning to the surface at the trucking company properties on the west side of Oldham Street south of Lombard Street. This tunnel would be approximately one mile in length. After crossing under the Canton and NS railroad rights-of-way and the O'Donnell Street Viaduct, the alignment of the tunnel would follow the east side of the NS right-of-way until it reaches the trucking company properties. On the surface, the transitway would cross the intersection of Ponca and Lombard streets at grade and continue on retained fill along the west side of the I-895 right-of-way to the south end of the I-895 viaduct over the NS Bayview railroad yards and Amtrak's Northeast Corridor. Beyond this point, the alignment follows the same route as the previous Crown East Alignment. A future extension to Dundalk could be accommodated. The transitway would continue at-grade to Bayview Boulevard, turning east on Eastern Avenue and then turning south onto Dundalk Avenue.

Stations (Highlandtown, Bayview MARC and Bayview)

This alignment offers opportunities for stations at the approximate center of the existing Crown Industrial Park for an underground station. The other stations are the Bayview MARC station, and at the Bayview Medical Center. A conceptual plan of the park-and-ride lot at the proposed Bayview MARC station is contained in Appendix A, Page 104.

Analysis

Access to Bayview

This alignment provides direct access to the heart of the Bayview Medical Center.

Connection to the proposed East Baltimore MARC Station

This alignment provides direct access to the proposed East Baltimore MARC Station.

Property Impacts

There is no property impact associated with this alignment.

Economic Development Opportunities

The potential underground station at Highlandtown provides redevelopment opportunities in the vicinity of the Crown Industrial Park.

Compatibility with Rail Freight Operations

The alignment does not require any coordination with rail freight operations. The I-895 right-of-way is sufficiently wide to accommodate the transitway but would require coordination with the Maryland Transportation Authority.

Impacts to Residences and Parking

This alignment has no impacts to residences and parking.

Impacts to Business Operations

This alignment has no impacts to business operations.

Traffic Impacts

This alignment crosses Lombard and Ponca Streets at grade. The impacts will be minimal.

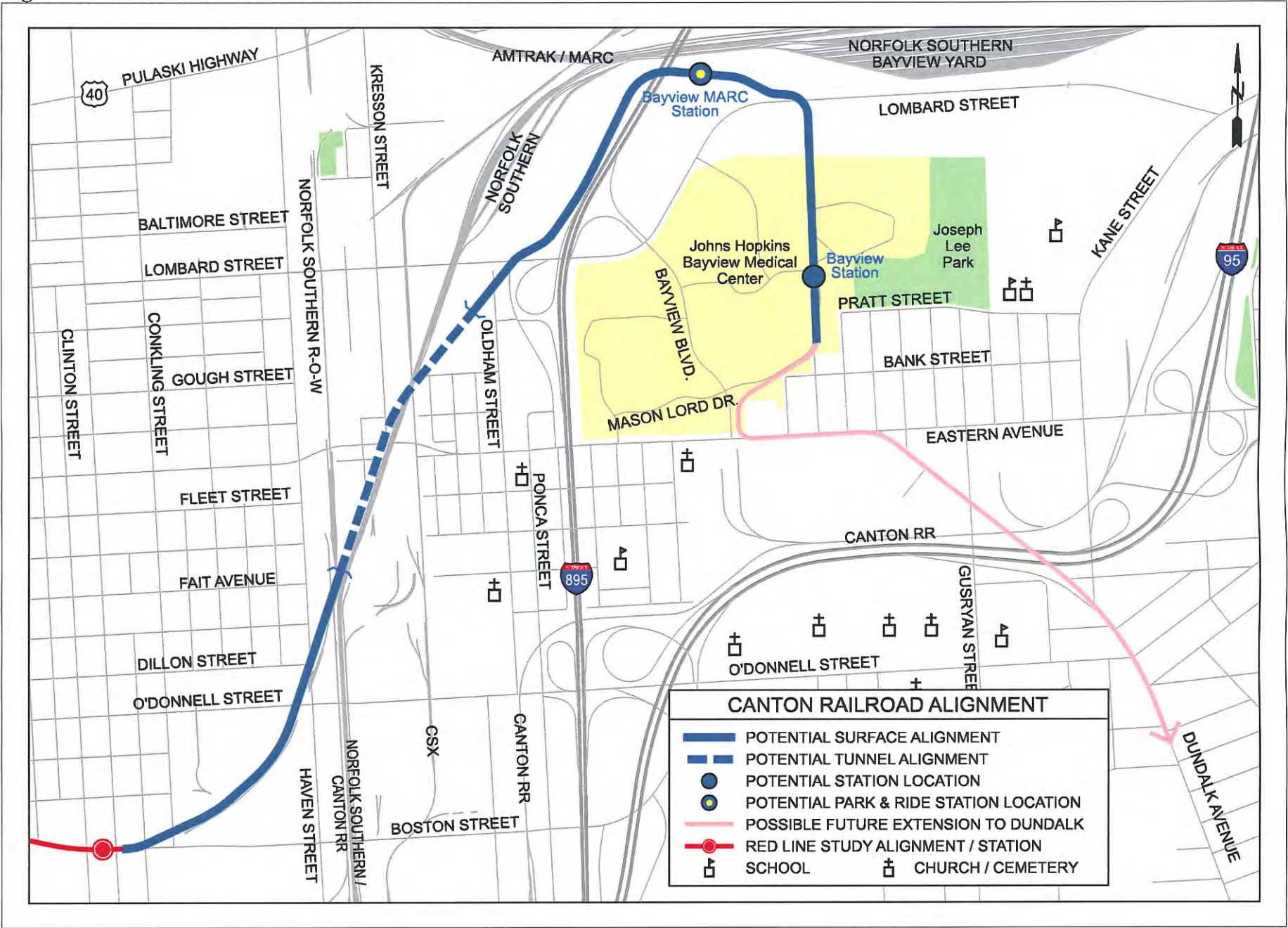
Environmental/Contamination Concerns

The tunnel section of the alignment has the greatest potential to encounter subsurface contaminated soils and groundwater.

Constructability

The long tunnel required for this alignment is necessitated by the close proximity of the Eastern Avenue Underpass, the CSXT right-of-way and the residences located on the west side of Macon Street near Gough Street.

Figure 3.7: CANTON RAILROAD ALIGNMENT



CANTON RAILROAD ALIGNMENT

Description

This alternative has the same alignment as the previous Crown West Alignment except that the tunnel in this case is relatively shorter. The tunnel extends from the east side of Haven Street and ascends to the surface in the existing trucking company properties west of Oldham Street and south of Lombard Street. Beyond this point, the alignment follows the same route as the previous Crown West Alignment all the way to the Bayview Medical Center. A future extension to Dundalk could be accommodated. The transitway would continue at-grade to Bayview Boulevard, turning east on Eastern Avenue and then turning south onto Dundalk Avenue.

Stations (Bayview MARC and Bayview)

This alignment offers opportunities for stations near the proposed East Baltimore MARC station, and at the Bayview Medical Center. A conceptual plan of the park-and-ride lot at the proposed Bayview MARC station is contained in Appendix A, Page 104.

Analysis

Access to Bayview

This alignment provides direct access to the heart of the Bayview Medical Center.

Connection to the proposed East Baltimore MARC Station

This alignment provides direct access to the proposed East Baltimore MARC Station.

Property Impacts

This alignment will require the acquisition of the trucking company properties west of the NS right-of-way and south of Eastern Avenue, as well as those that are west of Oldham Street and south of Lombard Street

Economic Development Opportunities

This alignment does not have any stations near proposed developments.

Compatibility with Rail Freight Operations

The alignment will require an operating agreement with Canton Railroad. The I-895 right-of-way is sufficiently wide to accommodate the transitway but would require coordination with the Maryland Transportation Authority.

Impacts to Residences and Parking

This alignment has no impacts to residences and parking.

Impacts to Business Operations

This alignment has no impacts to business operations.

Traffic Impacts

This alignment crosses Haven, Lombard and Ponca Streets at grade. The impacts will be minimal.

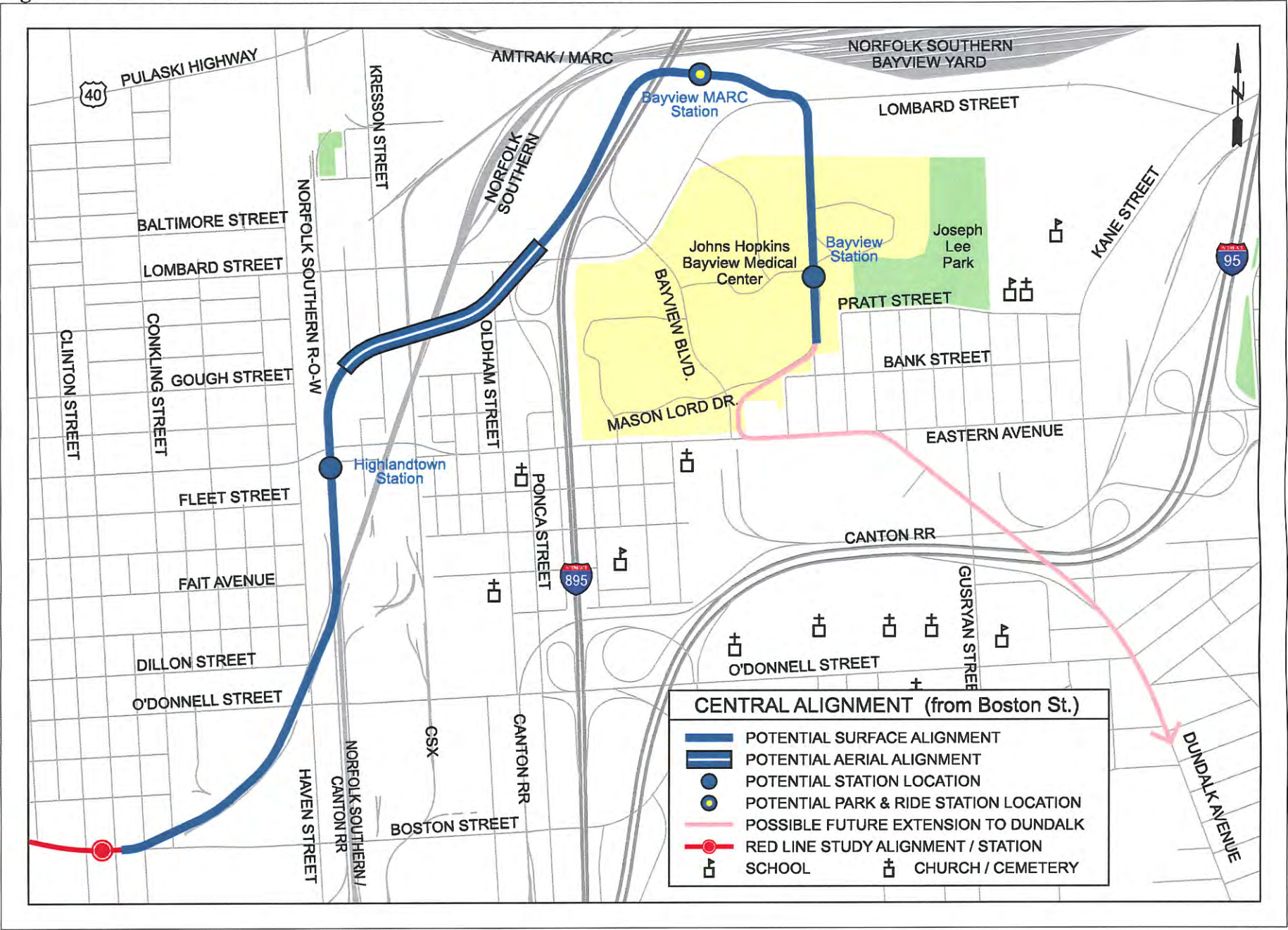
Environmental/Contamination Concerns

The tunnel section of the alignment has the greatest potential to encounter subsurface contaminated soils and groundwater.

Constructability

By remaining at-grade and staying west of the NS right-of-way, this alignment would avoid the design problems associated with crossing over or under the O'Donnell Street Viaduct and the Canton and NS rights-of-way.

Figure 3.8: CENTRAL ALIGNMENT FROM BOSTON STREET



CENTRAL ALIGNMENT FROM BOSTON STREET

Description

Beginning at Boston and Conkling Streets, the transitway would stay on the surface and follow the abandoned railroad right-of-way, cross under the O'Donnell Street Viaduct, and cross Haven Street at grade following the abandoned railroad right-of-way. Continuing past Haven Street it would cross the Canton Railroad's track at grade, then would turn northward and follow the east side of the inactive NS right-of-way to a point near Bank Street where it would turn eastward. After leaving the NS right-of-way it would pass through several small business and industrial properties on either side of Kresson Street and ascend to an aerial structure. The aerial structure would carry the transitway over the CSXT and active NS rights-of-way, one of the trucking company properties west of Oldham Street, as well as Oldham, Ponca and Lombard Streets. The transitway would descend to the surface on the west side of I-895 after crossing above Lombard Street. Beyond this point, the alignment follows the same route as the previous Canton Railroad Alignment all the way to the Bayview Medical Center. A future extension to Dundalk could be accommodated. The transitway would continue at-grade to Bayview Boulevard, turning east on Eastern Avenue and then turning south onto Dundalk Avenue.

Stations (Highlandtown, Bayview MARC and Bayview)

This alignment offers opportunities for stations at Eastern Avenue serving the Highlandtown business district, the proposed East Baltimore MARC station, and at the Bayview Medical Center. A conceptual plan of the park-and-ride lot at the Bayview MARC station is contained in Appendix A, Page 104.

Analysis

Access to Bayview

This alignment provides direct access to the heart of the Bayview Medical Center.

Connection to the proposed East Baltimore MARC Station

This alignment provides direct access to the proposed East Baltimore MARC Station.

Property Impacts

The alignment east of the inactive NS right-of-way would require the acquisition of all or part of several business properties and the demolition of several buildings. East of the active NS tracks the acquisition of at least one trucking company property would be necessary to provide a right-of-way for the aerial structure.

Economic Development Opportunities

This alignment does not have any stations near proposed developments.

Compatibility with Rail Freight Operations

The alignment will require an operating agreement with Norfolk Southern and the Canton Railroad. The I-895 right-of-way is sufficiently wide to accommodate the transitway but would require coordination with the Maryland Transportation Authority.

Impacts to Residences and Parking

This alignment has minimal impacts to residences and parking.

Impacts to Business Operations

This alignment has minimal impacts to business operations.

Traffic Impacts

This alignment crosses Haven Street at grade. The impacts will be minimal.

Environmental/Contamination Concerns

There is a low potential for contamination with this alignment.

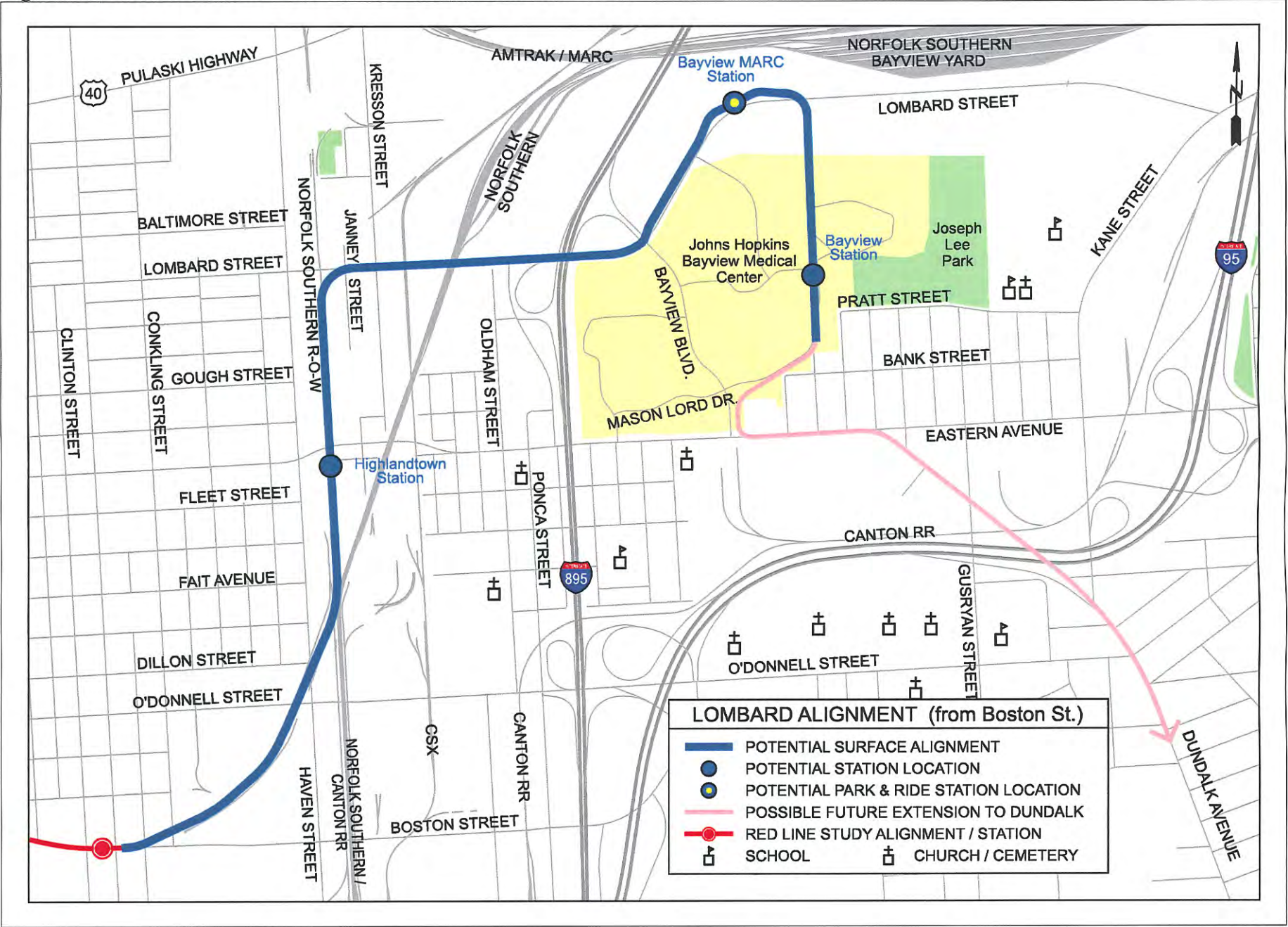
Constructability

By remaining at-grade and staying west of the NS right-of-way, this alignment would avoid the design problems associated with crossing over or under the O'Donnell Street Viaduct and the Canton and NS rights-of-way.

Special Concerns

This alignment has an aerial structure through a proposed development at North Greektown. This may require reconsideration of the alignment or coordination with the proposed development.

Figure 3.9: LOMBARD ALIGNMENT FROM BOSTON STREET



LOMBARD ALIGNMENT FROM BOSTON STREET

Description

This alignment follows the same route as the previous 'Central Alignment from Boston Street' all the way to the inactive NS right-of-way. However, instead of turning eastwards, this alignment continues to follow the east side of the inactive NS right-of-way to a point just south of Lombard Street where it would leave the NS right-of-way, turn eastward, and enter the bed of Lombard Street at its intersection with Janney Street. From this point it would become a shared-use transitway and would follow Lombard Street eastward, crossing under the existing CSXT Bridge over Lombard Street. Once past the intersection of Ponca and Lombard Streets the transitway would continue following the north side of Lombard Street eastward under I-895 and connect with the park-and-ride lot for the proposed East Baltimore MARC Station. Beyond this point, the alignment follows the same route as the previous 'Central Alignment from Boston Street' all the way to the Bayview Medical Center. A future extension to Dundalk could be accommodated. The transitway would continue at-grade to Bayview Boulevard, turning east on Eastern Avenue and then turning south onto Dundalk Avenue.

Stations (Highlandtown, Bayview MARC and Bayview)

This alignment offers opportunities for stations at Eastern Avenue serving the Highlandtown business district, at the proposed East Baltimore MARC station, and at the Bayview Medical Center. A conceptual plan of the park-and-ride lot at the Bayview MARC station is contained in Appendix A, Page 104.

Analysis

Access to Bayview

This alignment provides direct access to the heart of the Bayview Medical Center.

Connection to the proposed East Baltimore MARC Station

This alignment provides direct access to the proposed East Baltimore MARC Station.

Property Impacts

The curve from the inactive railroad right-of-way to Lombard Street would require the acquisition and demolition of a square block of small businesses and residences since significant grading would be required to elevate the transitway to the level of the street. If it is determined that there is insufficient horizontal or vertical clearance under the existing CSXT Bridge over Lombard Street, more properties will have to be acquired on the north side of Lombard Street.

Economic Development Opportunities

This alignment does not have any stations near proposed developments. A station near the northern end of Crown Industrial Park may provide redevelopment opportunities.

Compatibility with Rail Freight Operations

The alignment will require an operating agreement with Norfolk Southern and the Canton Railroad. Any impacts or tunnels on the I-895 right-of-way but would require coordination with the Maryland Transportation Authority.

Impacts to Residences and Parking

This alignment will have impacts to residences and parking along Lombard Street.

Impacts to Business Operations

This alignment will have impacts to business operations along Lombard Street.

Traffic Impacts

This alignment proposes shared-use transit in the Lombard Street right-of-way. This alignment will also reduce the number of lanes on Lombard Street under the I-895 Bridge. This will have impacts on traffic along Lombard Street

Environmental/Contamination Concerns

There is a low potential for contamination with this alignment.

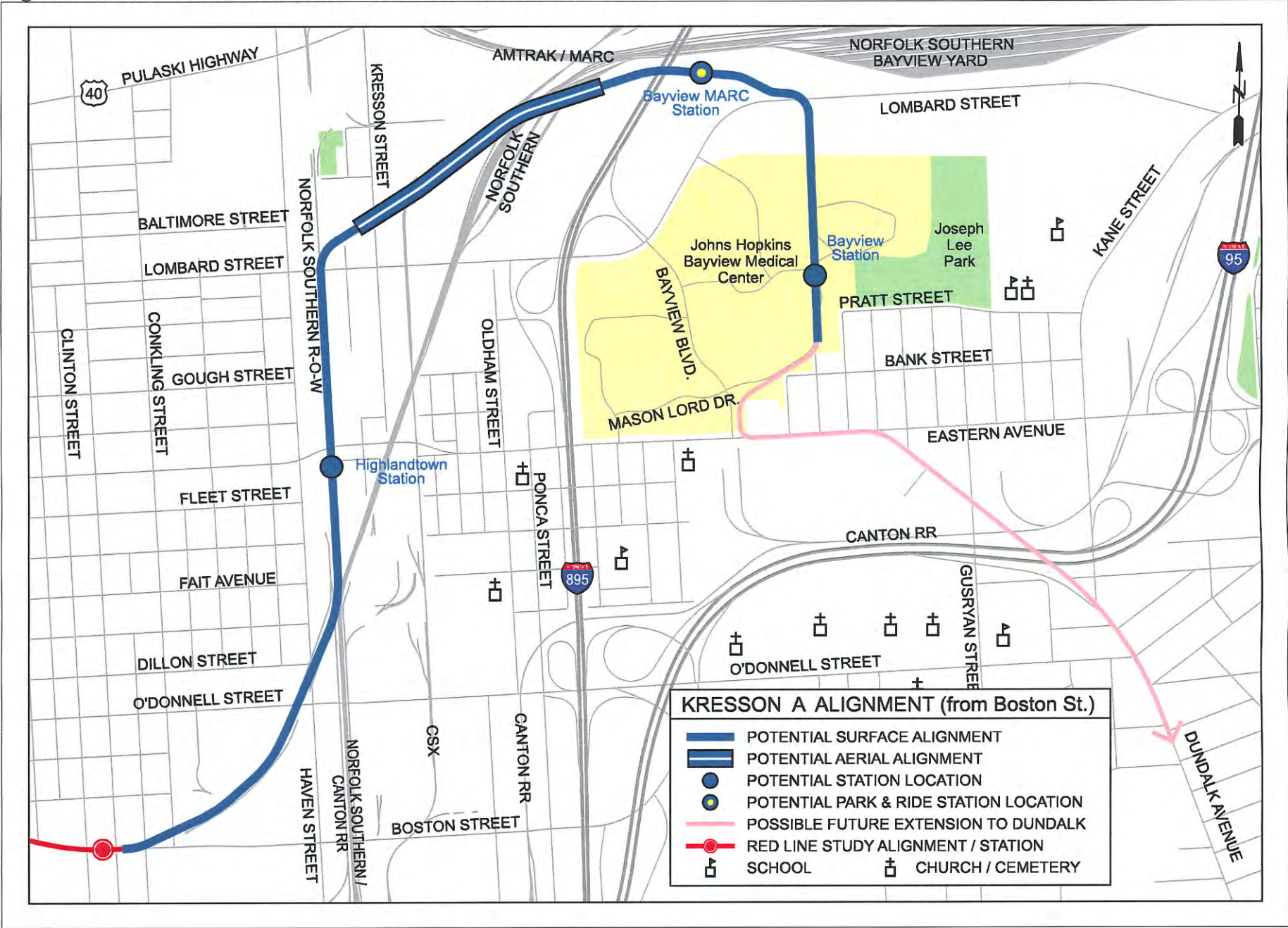
Constructability

By remaining at-grade and staying west of the NS right-of-way, this alignment would avoid the design problems associated with crossing over or under the O'Donnell Street Viaduct and the Canton and NS rights-of-way. However, the transitway is likely to be on an aerial structure over the NS tracks to avoid major structural modifications to the existing Lombard Street Viaduct as well as to avoid major impacts to traffic at the intersection of Lombard and Ponca Streets.

Special Concerns

In general, the impacts caused by this alignment, without achieving significant advantages over the other alignments, once it reaches Lombard Street are significant enough to warrant a recommendation for an early elimination.

Figure 3.10: KRESSON A ALIGNMENT FROM BOSTON STREET



KRESSON A ALIGNMENT FROM BOSTON STREET

Description

This alignment follows the same route as the previous 'Lombard Alignment' all the way to the inactive NS right-of-way. It continues to follow the east side of the inactive NS right-of-way to a point just north of Lombard Street where it would turn eastward to follow an abandoned CSXT right-of-way. On the abandoned CSXT right-of-way the transitway would ascend to an aerial structure and cross above Kresson Street and the active CSXT right-of-way. Remaining on the aerial structure, it would follow the east side of the active CSXT right-of-way to a point where it would be able to turn eastward and cross above the NS right-of-way and the north end of the NS Lombard Street intermodal facility. The transitway would then return to the surface and cross under I-895 near the south end of its viaduct over the NS Bayview railroad yards and Amtrak's Northeast Corridor to the park-and ride lot for the proposed East Baltimore MARC station. Beyond this point, the alignment follows the same route as the previous 'Central Alignment' all the way to the Bayview Medical Center. A future extension to Dundalk could be accommodated. The transitway would continue at-grade to Bayview Boulevard, turning east on Eastern Avenue and then turning south onto Dundalk Avenue.

Stations (Highlandtown, Bayview MARC and Bayview)

This alignment offers opportunities for stations at Eastern Avenue serving the Highlandtown business district and the Greentown neighborhood, the proposed East Baltimore MARC station, and at the Bayview Medical Center. A conceptual plan of the park-and-ride lot at the proposed Bayview MARC station is contained in Appendix A, Page 104.

Analysis

Access to Bayview

This alignment provides direct access to the heart of the Bayview Medical Center.

Connection to the proposed East Baltimore MARC Station

This alignment provides direct access to the proposed East Baltimore MARC Station.

Property Impacts

Use of the abandoned CSXT right-of-way west of Kresson Street may require acquisition of the former railroad land from the current owner and the removal of a small railroad bridge still in place over Kresson Street.

Economic Development Opportunities

This alignment does not have any stations near proposed developments. A station near the northern end of Crown Industrial Park may provide redevelopment opportunities.

Compatibility with Rail Freight Operations

The alignment will require an operating agreement with Norfolk Southern and the Canton Railroad.

Impacts to Residences and Parking

This alignment does not impact residences or parking.

Impacts to Business Operations

This alignment does not impact business operations.

Traffic Impacts

This alignment has no traffic impacts.

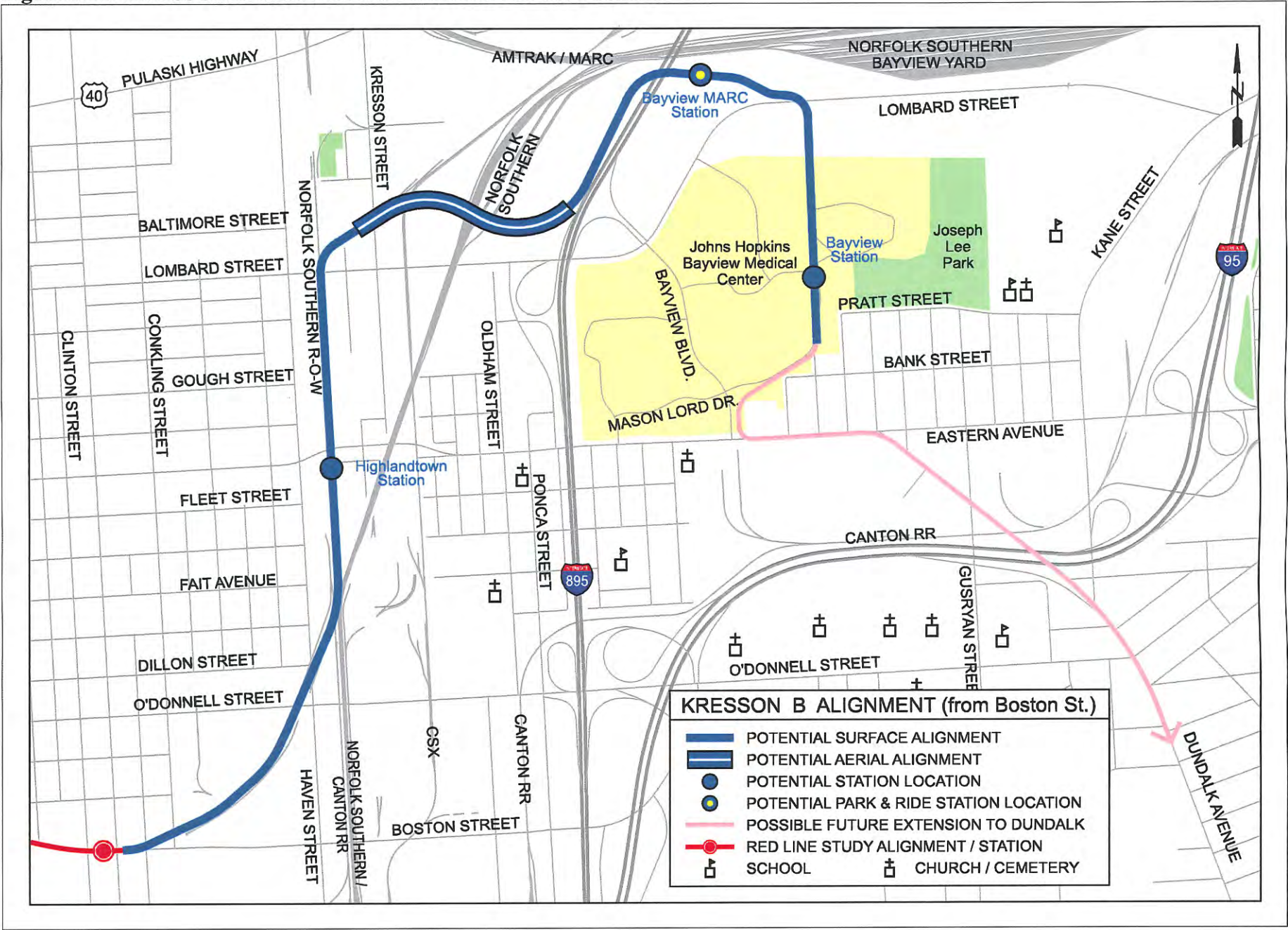
Environmental/Contamination Concerns

There is a moderate potential for contamination with this alignment.

Constructability

By remaining at-grade and staying west of the NS right-of-way, this alignment would avoid the design problems associated with crossing over or under the O'Donnell Street Viaduct and the Canton and NS rights-of-way. This alignment provides the most favorable horizontal alignment approach for the transitway to cross under the I-895 right-of-way near the south end of its viaduct over the NS Bayview railroad yards and Amtrak's Northeast Corridor.

Figure 3.11: KRESSON B ALIGNMENT FROM BOSTON STREET



KRESSON B FROM BOSTON STREET ALIGNMENT

Description

This alignment follows the same route as the previous 'Kresson A Alignment from Boston Street' all the way to the abandoned CSXT right-of-way. The transitway would then ascend to an aerial structure and cross above Kresson Street and the active CSXT right-of-way. Remaining on the aerial structure it would turn southeastward, and cross the vacant former lumber company property, the NS right-of-way, and the south end of the NS Lombard Street intermodal facility. While still above the NS intermodal facility it would turn northeastward to follow the west side of the I-895 right-of-way and return to the surface. Beyond this point, the alignment follows the same route as the previous 'Central Alignment from Boston Street' all the way to the Bayview Medical Center. A future extension to Dundalk could be accommodated. The transitway would continue at-grade to Bayview Boulevard, turning east on Eastern Avenue and then turning south onto Dundalk Avenue.

Stations (Highlandtown, Bayview MARC and Bayview)

This alignment offers opportunities for stations at Eastern Avenue serving the Highlandtown business district and the Greentown neighborhood, the proposed East Baltimore MARC station, and at the Bayview Medical Center. A conceptual plan of the park-and-ride lot at the Bayview MARC station is contained in Appendix A, Page 104.

Analysis

Access to Bayview

This alignment provides direct access to the heart of the Bayview Medical Center.

Connection to the proposed East Baltimore MARC Station

This alignment provides direct access to the proposed East Baltimore MARC Station.

Property Impacts

Use of the abandoned CSXT right-of-way west of Kresson Street may require acquisition of the former railroad land from the current owner and the removal of a small railroad bridge still in place over Kresson Street.

Economic Development Opportunities

This alignment does not have any stations near proposed developments. A station near the northern end of Crown Industrial Park may provide redevelopment opportunities.

Compatibility with Rail Freight Operations

The alignment will require an operating agreement with Norfolk Southern and the Canton Railroad.

Impacts to Residences and Parking

This alignment does not impact residences or parking.

Impacts to Business Operations

This alignment does not impact business operations.

Traffic Impacts

This alignment has no traffic impacts.

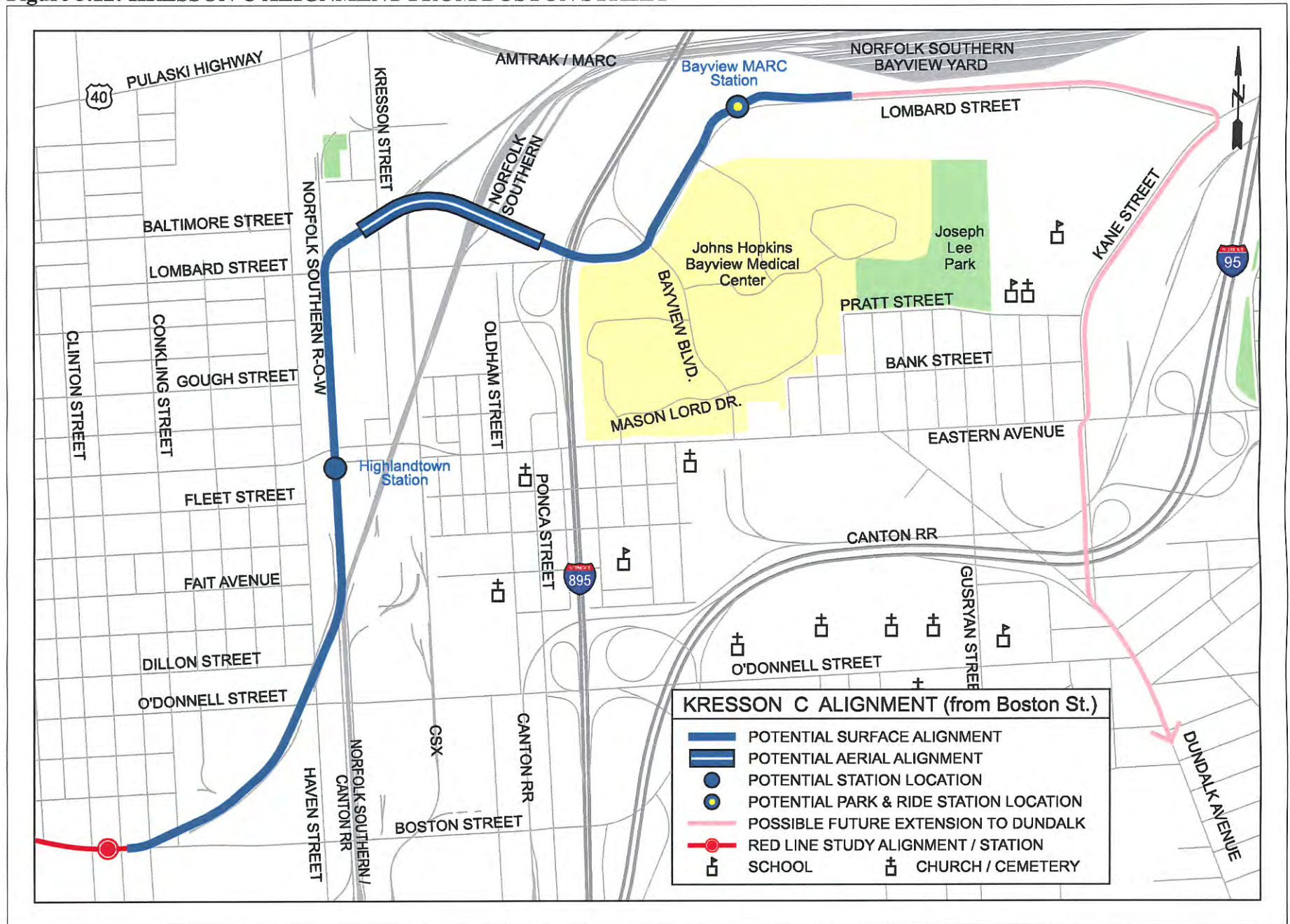
Environmental/Contamination Concerns

There is a moderate potential for contamination with this alignment.

Constructability

By remaining at-grade and staying west of the NS right-of-way, this alignment would avoid the design problems associated with crossing over or under the O'Donnell Street Viaduct and the Canton and NS rights-of-way. This alignment provides the most favorable horizontal alignment approach for the transitway to cross under the I-895 right-of-way near the south end of its viaduct over the NS Bayview railroad yards and Amtrak's Northeast Corridor.

Figure 3.12: KRESSON C ALIGNMENT FROM BOSTON STREET



KRESSON C ALIGNMENT FROM BOSTON STREET

Description

This alignment follows the same route as the previous 'Kresson B Alignment from Boston Street' all the way to the aerial structure above Kresson Street and the active CSXT right-of-way. Remaining on the aerial structure the transitway would turn southeastward, and cross the vacant former lumber company property, the NS right-of-way, and the south end of the NS Lombard Street intermodal facility. The transitway would return to the surface west of the I-895 corridor and cross under the roadway along the north side of Lombard Street. Beyond this point, the alignment follows the same route as the previous 'Lombard Alignment from Boston Street' all the way to the proposed East Baltimore MARC Station. A future extension to Dundalk could be accommodated by continuing the transitway at-grade, along the north side of Lombard Street. The transitway would then turn south on Kane Street and continue onto Dundalk Avenue.

Stations (Highlandtown and Bayview MARC)

This alignment offers opportunities for stations at Eastern Avenue serving the Highlandtown business district and the Greektown neighborhood and the proposed East Baltimore MARC station. This alignment does not have a station at Bayview Medical Center.

Analysis

Access to Bayview

This alignment does not provide access to the Bayview Medical Center. A shuttle service will be required.

Connection to the proposed East Baltimore MARC Station

This alignment provides direct access to the proposed East Baltimore MARC Station.

Property Impacts

Use of the abandoned CSXT right-of-way west of Kresson Street may require acquisition of the former railroad land from the current owner and the removal of a small railroad bridge still in place over Kresson Street.

Economic Development Opportunities

This alignment does not have any stations near proposed developments. A station near the northern end of Crown Industrial Park may provide redevelopment opportunities.

Compatibility with Rail Freight Operations

The alignment will require an operating agreement with Norfolk Southern and the Canton Railroad. Any impacts or tunnels on the I-895 right-of-way would require coordination with the Maryland Transportation Authority.

Impacts to Residences and Parking

This alignment does not impact residences or parking.

Impacts to Business Operations

This alignment does not impact business operations.

Traffic Impacts

The configuration will reduce the number of lanes on Lombard Street under the I-895 Bridge and will have impacts to the traffic on Lombard Street.

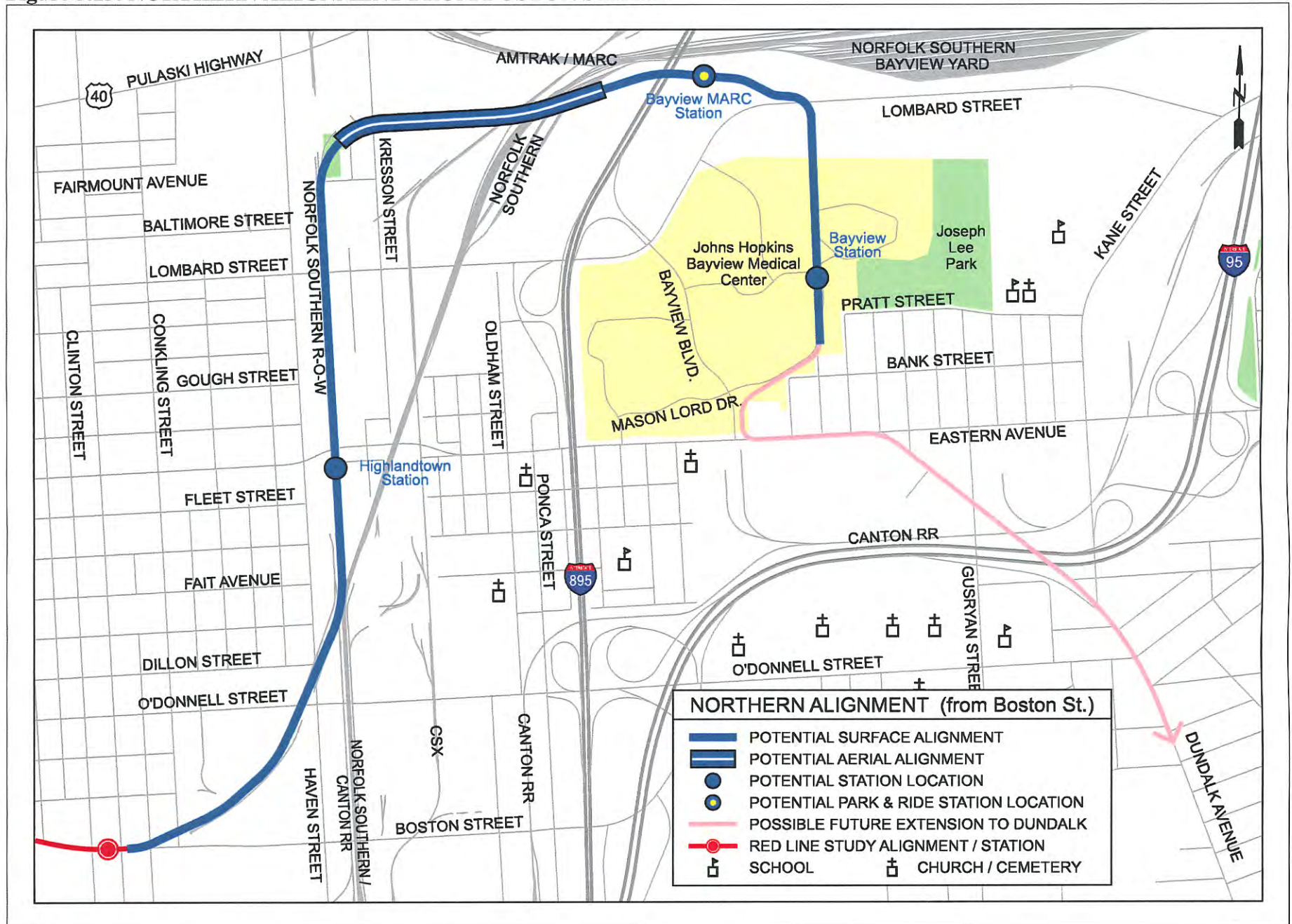
Environmental/Contamination Concerns

There is a moderate potential for contamination with this alignment.

Constructability

By remaining at-grade and staying west of the NS right-of-way, this alignment would avoid the design problems associated with crossing over or under the O'Donnell Street Viaduct and the Canton and NS rights-of-way. This alignment is likely to require a separate bridge or short tunnel to avoid structural modifications to the existing highway bridge.

Figure 3.13: NORTHERN ALIGNMENT FROM BOSTON STREET



NORTHERN ALIGNMENT FROM BOSTON STREET

Description

This alignment follows the same route as the previous 'Kresson A Alignment from Boston Street' all the way to the inactive NS right-of-way. It continues to follow the east side of the inactive NS right-of-way to a point near Fairmount Avenue where it would leave the inactive NS right-of-way and begin to turn eastward and ascend to an aerial structure that would follow the north side of Fayette Street east of Kresson Street. The aerial structure would cross above Fayette and Kresson Streets as well as the CSXT and active NS rights-of-way and the north end of the NS Lombard Street intermodal facility. Beyond this point, the alignment follows the same route as the previous 'Kresson A Alignment from Boston Street' all the way to the Bayview Medical Center. A future extension to Dundalk could be accommodated. The transitway would continue at-grade to Bayview Boulevard, turning east on Eastern Avenue and then turning south onto Dundalk Avenue.

Stations (Highlandtown, Bayview MARC and Bayview)

This alignment offers opportunities for stations at Eastern Avenue serving the Highlandtown business district, the proposed East Baltimore MARC station, and at the Bayview Medical Center. A conceptual plan of the park-and-ride lot at Bayview MARC station is contained in Appendix A, Page 104.

Analysis

Access to Bayview

This alignment provides direct access to the heart of the Bayview Medical Center.

Connection to the proposed East Baltimore MARC Station

This alignment provides direct access to the proposed East Baltimore MARC Station.

Property Impacts

Use of the abandoned CSXT right-of-way west of Kresson Street may require acquisition of the former railroad land from the current owner and the removal of a small railroad bridge still in place over Kresson Street.

Economic Development Opportunities

This alignment does not have any stations near proposed developments. A station near the northern end of Crown Industrial Park may provide redevelopment opportunities.

Compatibility with Rail Freight Operations

The alignment will require an operating agreement with Norfolk Southern and the Canton Railroad.

Impacts to Residences and Parking

This alignment does not impact residences or parking.

Impacts to Business Operations

This alignment does not impact business operations.

Traffic Impacts

This alignment has no impacts on traffic.

Environmental/Contamination Concerns

There is a higher potential for the presence of contaminated soils or groundwater with this alignment.

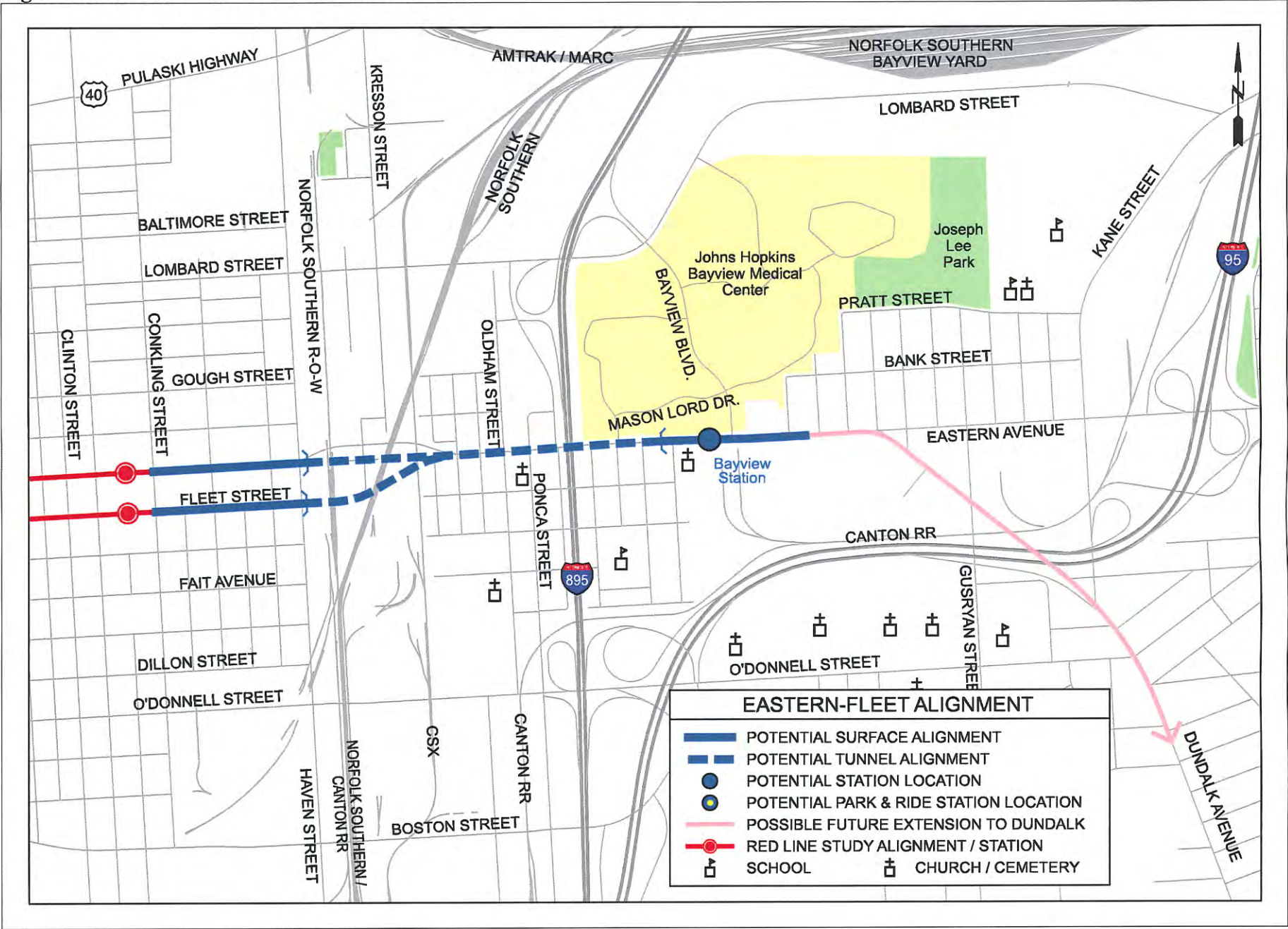
Constructability

By remaining at-grade and staying west of the NS right-of-way, this alignment would avoid the design problems associated with crossing over or under the O'Donnell Street Viaduct and the Canton and NS rights-of-way.

Special Concerns

This alignment would impact publicly owned parkland at Janney Street Park. This park is maintained by Baltimore City. According to the Section 4(f) of the U.S. Department of Transportation Act of 1966 (49 U.S.C. 393[c]), the use of land from a publicly-owned parks or recreation area, wildlife or waterfowl refuge, or land from a significant historic site (as determined by the official having jurisdiction over the park, recreation area, refuge or site) only if there is **no prudent and feasible alternative** to using that land; and the project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use. As other prudent and feasible alternatives exist, this alternative should be eliminated from further consideration.

Figure 3.14: EASTERN-FLEET ALIGNMENT



EASTERN-FLEET ALIGNMENT

Description

Beginning at Eastern Avenue-Fleet Street and Conkling Street, this alignment would continue along Eastern Avenue and Fleet Street on the surface to Haven Street. After crossing Haven Street, the alignment would continue on Eastern Avenue and Fleet Streets respectively and then descend into two tunnels crossing under the NS right-of-way (currently out of service) located approximately 300 feet east of Haven Street. The Fleet Street tunnel would then curve northward and then eastward to join with the tunnel under Eastern Avenue resulting in a paired tunnel. The paired tunnel would continue on the alignment of Eastern Avenue and ascend to the surface in a single portal after crossing under the I-895 corridor. The alignment would connect to a station on the Pemco property, at the intersection of Eastern Avenue and Bayview Boulevard. A future extension to Dundalk could be accommodated by continuing the transitway in Eastern Avenue and turning south onto Dundalk Avenue.

Stations (Bayview)

This alignment offers an opportunity for a station on Eastern Avenue just west of Bayview Boulevard.

Analysis

Access to Bayview

This alignment does not provide on-site access to the Bayview Medical Center. Access to the heart of the Bayview Medical Center would require a walk of slightly more than a quarter of a mile or the implementation of a shuttle service.

Connection to the proposed East Baltimore MARC Station

This alignment does not provide direct access to the proposed East Baltimore MARC Station. A shuttle service is required to access the station.

Property Impacts

This alignment has no property impacts.

Economic Development Opportunities

This alignment would cross the Pemco site which was identified by the City as having redevelopment potential for new industrial uses.

Compatibility with Rail Freight Operations

This alternative may impact Pemco site's access to rail freight operations.

Impacts to Residences and Parking

There will be impacts to residences and parking along Eastern Avenue.

Impacts to Business Operations

There will be impacts to business operations along Eastern Avenue.

Traffic Impacts

This alignment will have impacts to traffic along Eastern Avenue.

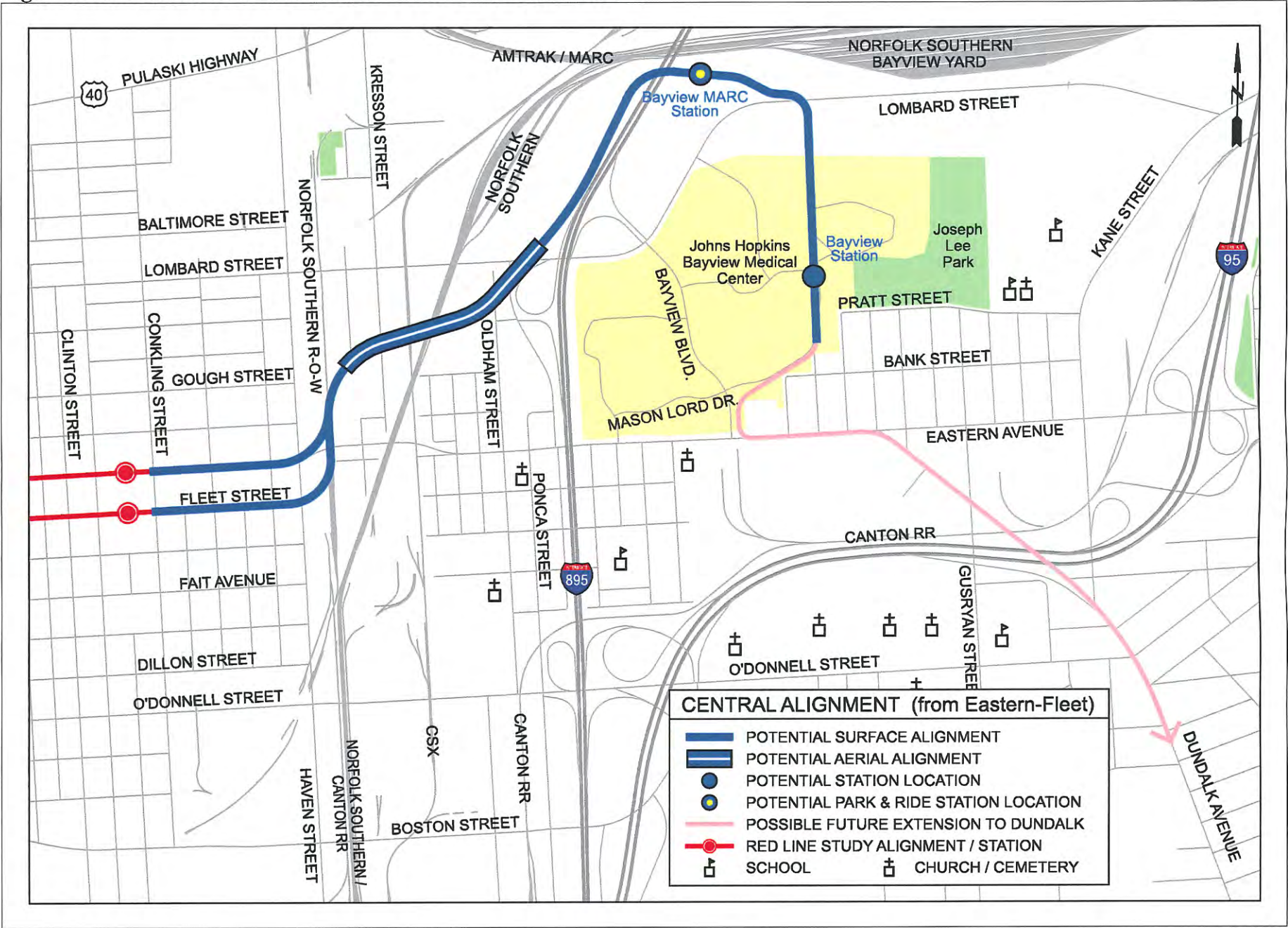
Environmental/Contamination Concerns

The tunnel section of the alignment has the greatest potential to encounter subsurface contaminated soils and groundwater.

Constructability

The short distance from Haven Street to the inactive NS right-of-way forces the grade between the surface and the bored tunnel to be approximately 8.6% due to the necessity of providing vertical clearance from the transitway to the bottom of a new bridge that would have to be built to carry the tracks now located in the railroad right-of-way. The 8.6% grade would be approximately 100 feet long and would be located between a pair of reverse vertical curves.

Figure 3.15: CENTRAL ALIGNMENT FROM EASTERN-FLEET



CENTRAL ALIGNMENT FROM EASTERN-FLEET

Description

Beginning at Eastern Avenue and Fleet Street, this alignment would continue east on the surface of Eastern and Fleet to Haven Street. After crossing Haven Street at grade it would turn northward onto the currently inactive NS right-of-way. From this point further, this alignment follows the same route as the previously discussed 'Central Alignment from Boston Street' all the way to the Bayview Medical Center. A future extension to Dundalk could be accommodated. The transitway would continue at-grade to Bayview Boulevard, turning east on Eastern Avenue and then turning south onto Dundalk Avenue.

Stations (Bayview MARC and Bayview)

This alignment offers opportunities for stations at the proposed East Baltimore MARC station, and at the Bayview Medical Center. A conceptual plan of the park-and-ride lot at the Bayview MARC station is contained in Appendix A, Page 104.

Analysis

Access to Bayview

This alignment provides direct access to the heart of the Bayview Medical Center.

Connection to the proposed East Baltimore MARC Station

This alignment provides direct access to the proposed East Baltimore MARC Station.

Property Impacts

The alignment east of the inactive NS right-of-way would require the acquisition of all or part of several business properties and the demolition of several buildings. East of the active NS tracks the acquisition of at least one trucking company property would be necessary to provide a right-of-way for the aerial structure.

Economic Development Opportunities

This alignment does not have any stations near proposed developments.

Compatibility with Rail Freight Operations

The alignment will require an operating agreement with Norfolk Southern and the Canton Railroad. The I-895 right-of-way is sufficiently wide to accommodate the transitway but would require coordination with the Maryland Transportation Authority.

Impacts to Residences and Parking

There will be no impacts to residences and parking.

Impacts to Business Operations

There will be some impacts to business operations along Eastern Avenue.

Traffic Impacts

Transit at grade on Eastern Avenue and Fleet Street is likely to have impacts to traffic particularly along Eastern Avenue.

Environmental/Contamination Concerns

There is a low potential for contamination with this alignment.

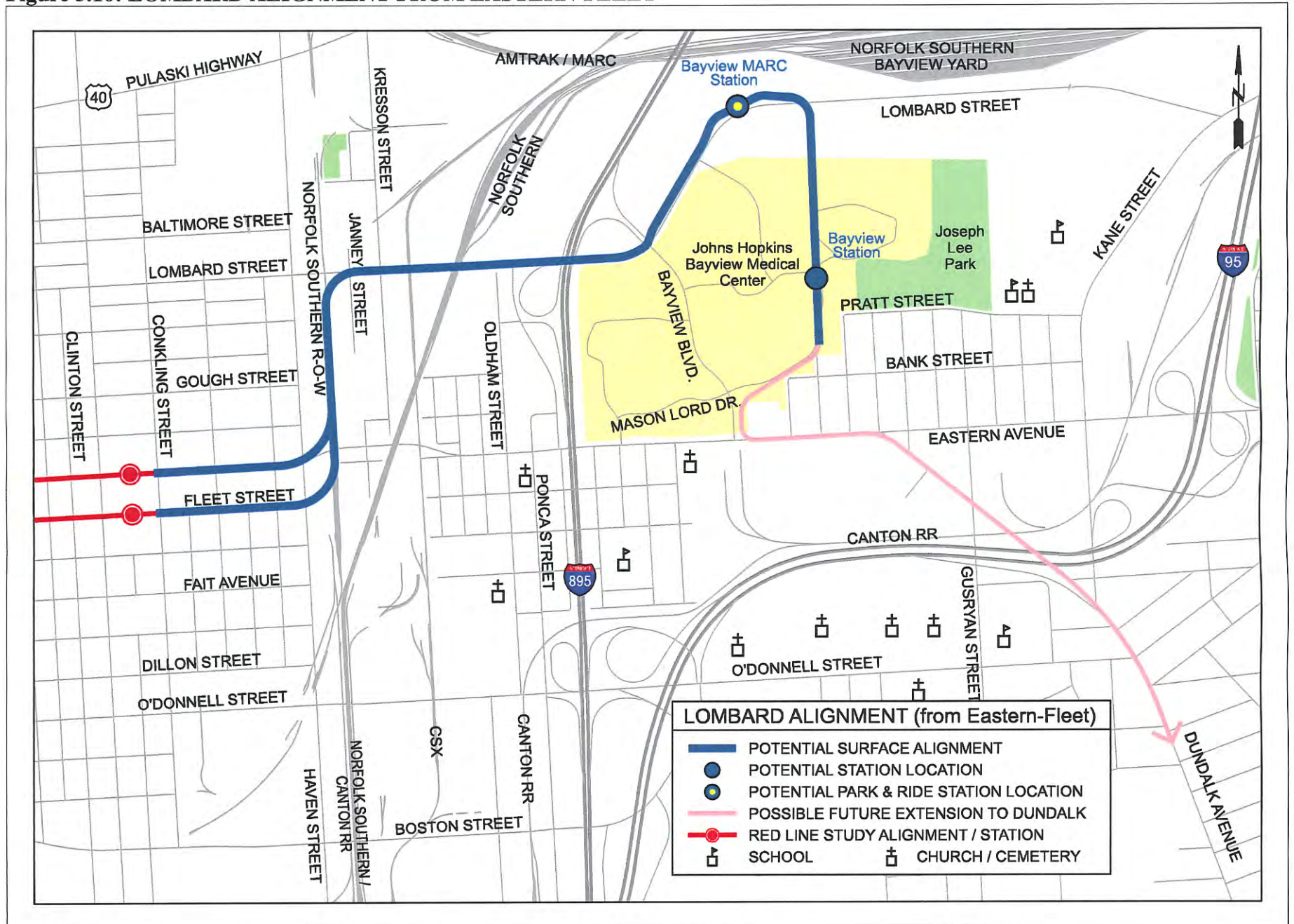
Constructability

There are no apparent challenges.

Special Concerns

This alignment has an aerial structure through a proposed development at North Greektown. This may require reconsideration of the alignment or coordination with the proposed development.

Figure 3.16: LOMBARD ALIGNMENT FROM EASTERN-FLEET



LOMBARD ALIGNMENT FROM EASTERN-FLEET

Description

Beginning at Eastern Avenue and Fleet Street, this alignment would continue east on the surface of Eastern and Fleet to Haven Street. After crossing Haven Street at grade it would turn northward onto the currently inactive NS right-of-way. From this point further, this alignment follows the same route as the previously discussed 'Lombard Alignment from Boston Street' all the way to the Bayview Medical Center and beyond.

Stations (Bayview MARC and Bayview)

This alignment offers opportunities for stations at the proposed East Baltimore MARC station, and at the Bayview Medical Center. A conceptual plan of the park-and-ride lot at the Bayview MARC station is contained in Appendix A, Page 104.

Analysis

Access to Bayview

This alignment provides direct access to the heart of the Bayview Medical Center.

Connection to the proposed East Baltimore MARC Station

This alignment provides direct access to the proposed East Baltimore MARC Station.

Property Impacts

The curve from Fleet Street onto the NS right-of-way will require the acquisition of the Meals-On-Wheels of Central Maryland headquarters property and the demolition of the building. The curve from the inactive railroad right-of-way to Lombard Street would require the acquisition and demolition of a square block of small businesses and residences since significant grading would be required to elevate the transitway to the level of the street. If it is determined that there is insufficient horizontal or vertical clearance under the existing CSXT Bridge over Lombard Street, more properties will have to be acquired on the north side of Lombard Street.

Economic Development Opportunities

This alignment does not have any stations near proposed developments.

Compatibility with Rail Freight Operations

The alignment will require an operating agreement with Norfolk Southern and the Canton Railroad. The I-895 right-of-way is sufficiently wide to accommodate the transitway but would require coordination with the Maryland Transportation Authority.

Impacts to Residences and Parking

There will be impacts to residences and parking along Lombard Street.

Impacts to Business Operations

There will be impacts to business operations along Eastern Avenue and Lombard Street.

Traffic Impacts

Transit at grade on Eastern Avenue and Fleet Street is likely to have adverse impacts to traffic particularly along Eastern Avenue. This alignment proposes shared-use transit in the Lombard Street right-of-way. This alignment will also reduce the number of lanes on Lombard Street under the I-895 Bridge. This will have impacts on traffic along Lombard Street.

Environmental/Contamination Concerns

There is a low potential for contamination with this alignment.

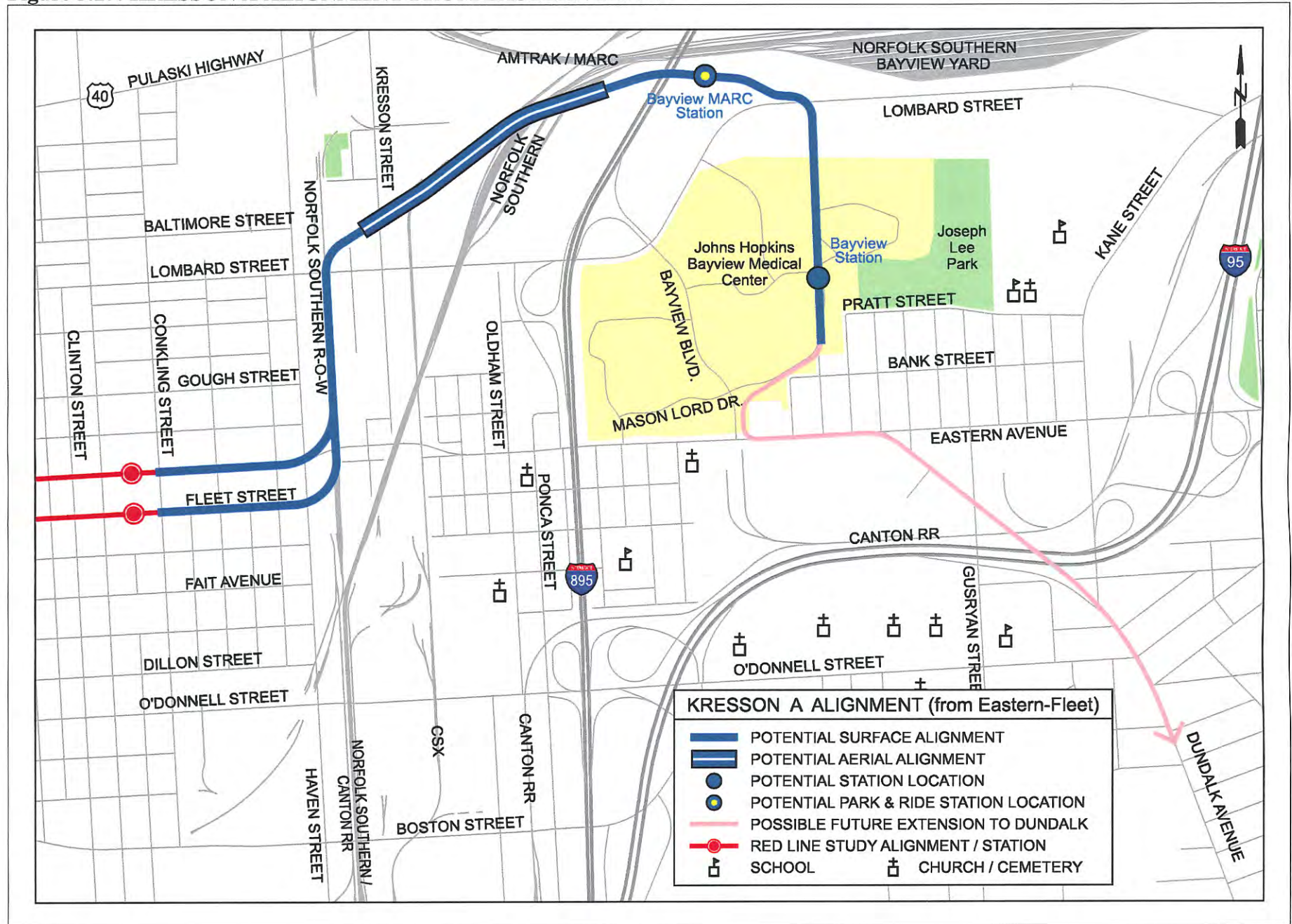
Constructability

The transitway is likely to be on an aerial structure over the NS tracks to avoid major structural modifications to the existing Lombard Street Viaduct as well as to avoid major impacts to traffic at the intersection of Lombard and Ponca Streets.

Special Concerns

In general, the impacts caused by this alignment, without achieving significant advantages over the other alignments, once it reaches Lombard Street are significant enough to warrant a recommendation for an early elimination of the Lombard Alignment.

Figure 3.17: KRESSON A ALIGNMENT FROM EASTERN-FLEET



KRESSON A ALIGNMENT FROM EASTERN-FLEET

Description

Beginning at Eastern Avenue and Fleet Street, this alignment would continue east on the surface of Eastern and Fleet to Haven Street. After crossing Haven Street at grade it would turn northward onto the currently inactive NS right-of-way. From this point further, this alignment follows the same route as the previously discussed 'Kresson A Alignment from Boston Street' all the way to the Bayview Medical Center. A future extension to Dundalk could be accommodated. The transitway would continue at-grade to Bayview Boulevard, turning east on Eastern Avenue and then turning south onto Dundalk Avenue.

Stations (Bayview MARC and Bayview)

This alignment offers opportunities for stations at the proposed East Baltimore MARC station, and at the Bayview Medical Center. A conceptual plan of the park-and-ride lot at the Bayview MARC station is contained in Appendix A, Page 104.

Analysis

Access to Bayview

This alignment provides direct access to the heart of the Bayview Medical Center.

Connection to the proposed East Baltimore MARC Station

This alignment provides direct access to the proposed East Baltimore MARC Station.

Property Impacts

The curve from Eastern Avenue to the inactive NS right-of-way will require the acquisition of all or part of the property at the northeast corner of Haven Street and Eastern Avenue. The curve from Fleet Street onto the NS right-of-way will require the acquisition of the Meals-On-Wheels of Central Maryland headquarters property and the demolition of the building. Use of the abandoned CSXT right-of-way west of Kresson Street may require acquisition of the former railroad land from the current owner and the removal of a small railroad bridge still in place over Kresson Street.

Economic Development Opportunities

This alignment has no stations near proposed developments.

Compatibility with Rail Freight Operations

The alignment will require an operating agreement with Norfolk Southern and the Canton Railroad.

Impacts to Residences and Parking

There will be impacts to residences and parking along Eastern Avenue.

Impacts to Business Operations

There will be impacts to business operations along Eastern Avenue.

Traffic Impacts

Transit at grade on Eastern Avenue and Fleet Street will have impacts to traffic along Eastern Avenue.

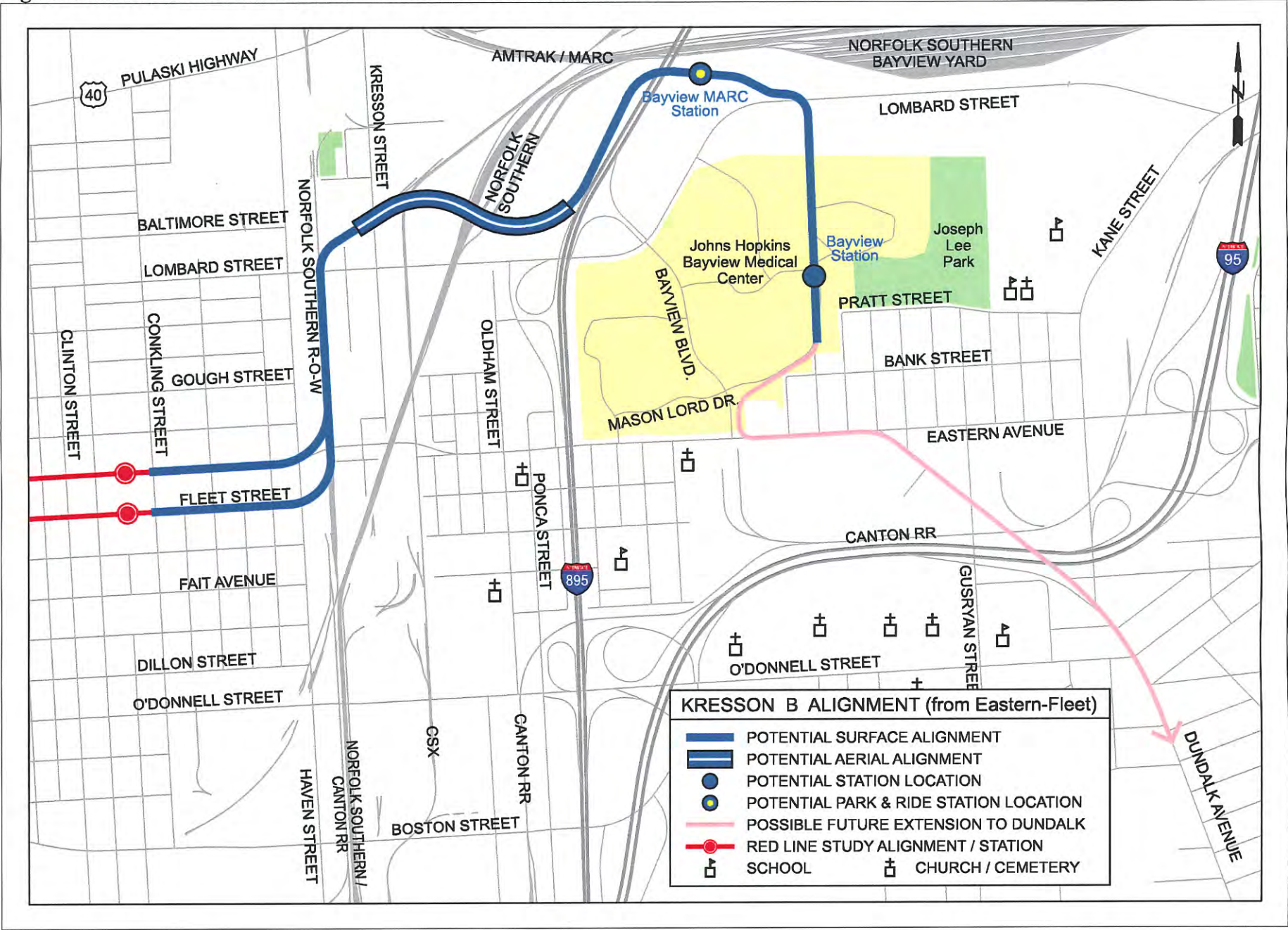
Environmental/Contamination Concerns

There is a moderate potential for contamination with this alignment.

Constructability

This alignment provides the most favorable horizontal alignment approach for the transitway to cross under the I-895 right-of-way near the south end of its viaduct over the NS Bayview railroad yards and Amtrak's Northeast Corridor.

Figure 3.18: KRESSON B ALIGNMENT FROM EASTERN-FLEET



KRESSON B ALIGNMENT FROM EASTERN-FLEET

Description

Beginning at Eastern Avenue and Fleet Street, this alignment would continue east on the surface of Eastern and Fleet to Haven Street. After crossing Haven Street at grade it would turn northward onto the currently inactive NS right-of-way. From this point further, this alignment follows the same route as the previously discussed 'Kresson B Alignment from Boston Street' all the way to the Bayview Medical Center. A future extension to Dundalk could be accommodated. The transitway would continue at-grade to Bayview Boulevard, turning east on Eastern Avenue and then turning south onto Dundalk Avenue.

Stations (Bayview MARC and Bayview)

This alignment offers opportunities for stations at the proposed East Baltimore MARC station, and at the Bayview Medical Center. A conceptual plan of the park-and-ride lot at the Bayview MARC station is contained in Appendix A, Page 104.

Analysis

Access to Bayview

This alignment provides direct access to the heart of the Bayview Medical Center.

Access to the proposed East Baltimore MARC Station

This alignment provides direct access to the proposed East Baltimore MARC Station.

Property Impacts

The curve from Eastern Avenue to the inactive NS right-of-way will require the acquisition of all or part of the property at the northeast corner of Haven Street and Eastern Avenue. The curve from Fleet Street onto the NS right-of-way will require the acquisition of the Meals-On-Wheels of Central Maryland headquarters property and the demolition of the building. Use of the abandoned CSXT right-of-way west of Kresson Street may require acquisition of the former railroad land from the current owner and the removal of a small railroad bridge still in place over Kresson Street.

Economic Development Opportunities

This alignment has no stations near proposed developments.

Compatibility with Rail Freight Operations

The alignment will require an operating agreement with Norfolk Southern and the Canton Railroad.

Impacts to Residences and Parking

There will be impacts to residences and parking along Eastern Avenue.

Impacts to Business Operations

There will be impacts to business operations along Eastern Avenue.

Traffic Impacts

Transit at grade on Eastern Avenue and Fleet Street is likely to have impacts to traffic along Eastern Avenue.

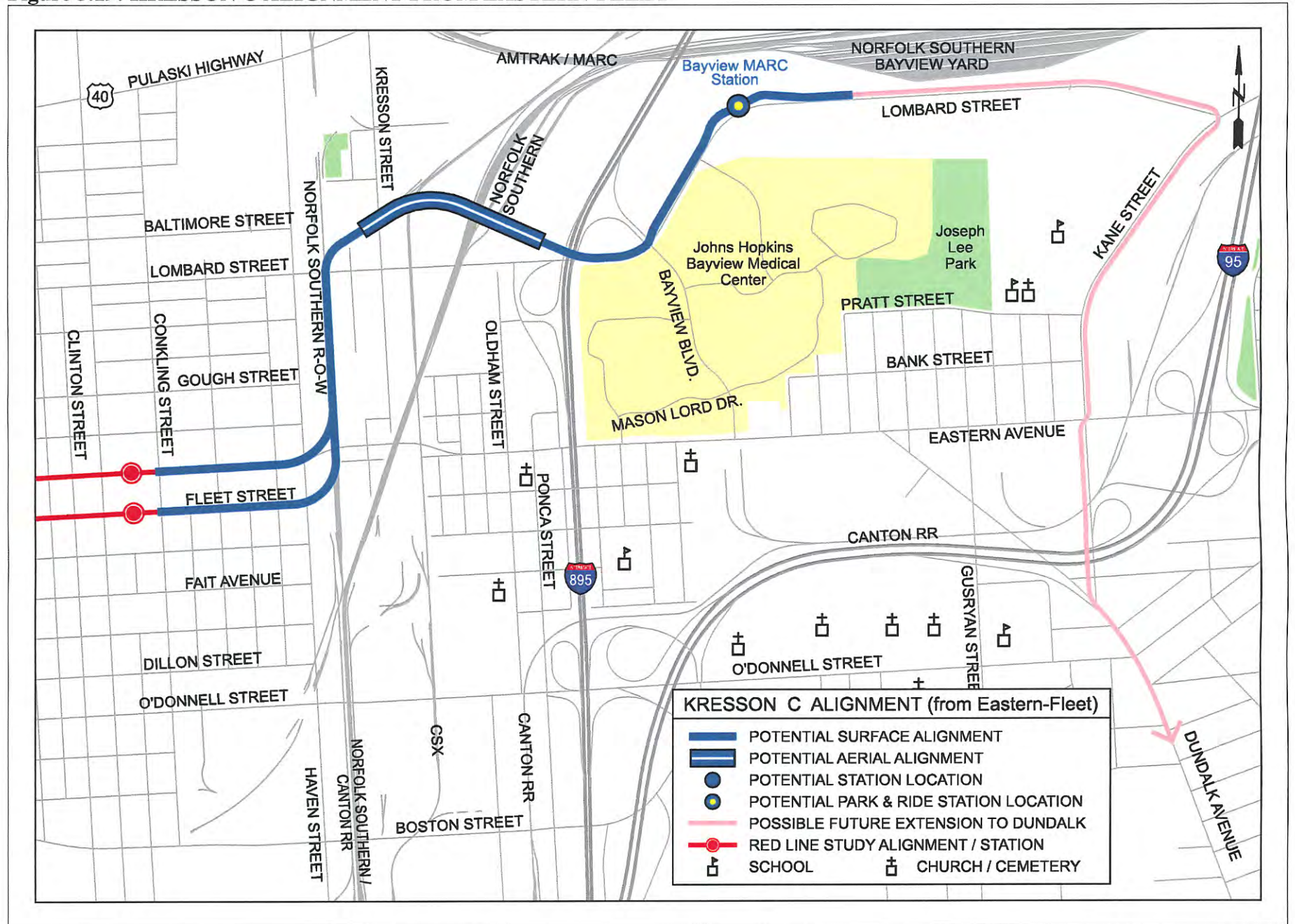
Environmental/Contamination Concerns

There is a moderate potential for contamination with this alignment.

Constructability

This alignment provides the most favorable horizontal alignment approach for the transitway to cross under the I-895 right-of-way near the south end of its viaduct over the NS Bayview railroad yards and Amtrak's Northeast Corridor.

Figure 3.19: KRESSON C ALIGNMENT FROM EASTERN-FLEET



KRESSON C ALIGNMENT FROM EASTERN-FLEET

Description

Beginning at Eastern Avenue and Fleet Street, this alignment would continue east on the surface of Eastern and Fleet to Haven Street. After crossing Haven Street at grade it would turn northward onto the currently inactive NS right-of-way. From this point further, this alignment follows the same route as the previously discussed 'Kresson C Alignment from Boston Street' all the way to the proposed East Baltimore MARC Station. A future extension to Dundalk could be accommodated by continuing the transitway at-grade, along the north side of Lombard Street. The transitway would then turn south on Kane Street and continue onto Dundalk Avenue.

Stations (Bayview MARC)

A station near the proposed East Baltimore MARC is the only station opportunity in this alignment. A conceptual plan of the park-and-ride lot at the Bayview MARC station is contained in Appendix A, Page 104. This alignment does not have a station at Bayview Medical Center.

Analysis

Access to Bayview

This alignment does not provide access to the Bayview Medical Center. A shuttle service will be required.

Connection to the proposed East Baltimore MARC Station

This alignment provides direct access to the proposed East Baltimore MARC Station.

Property Impacts

The curve from Eastern Avenue to the inactive NS right-of-way will require the acquisition of all or part of the property at the northeast corner of Haven Street and Eastern Avenue. The curve from Fleet Street onto the NS right-of-way will require the acquisition of the Meals-On-Wheels of Central Maryland headquarters property and the demolition of the building. Use of the abandoned CSXT right-of-way west of Kresson Street may require acquisition of the former railroad land from the current owner and the removal of a small railroad bridge still in place over Kresson Street.

Economic Development Opportunities

This alignment has no stations near proposed developments.

Compatibility with Rail Freight Operations

The alignment will require an operating agreement with Norfolk Southern and the Canton Railroad. Any impacts or tunnels on the I-895 right-of-way would require coordination with the Maryland Transportation Authority.

Impacts to Residences and Parking

There will be impacts to residences and parking along Eastern Avenue.

Impacts to Business Operations

There will be impacts to business operations along Eastern Avenue.

Traffic Impacts

Transit at grade on Eastern Avenue and Fleet Street will have impacts to traffic along Eastern Avenue.

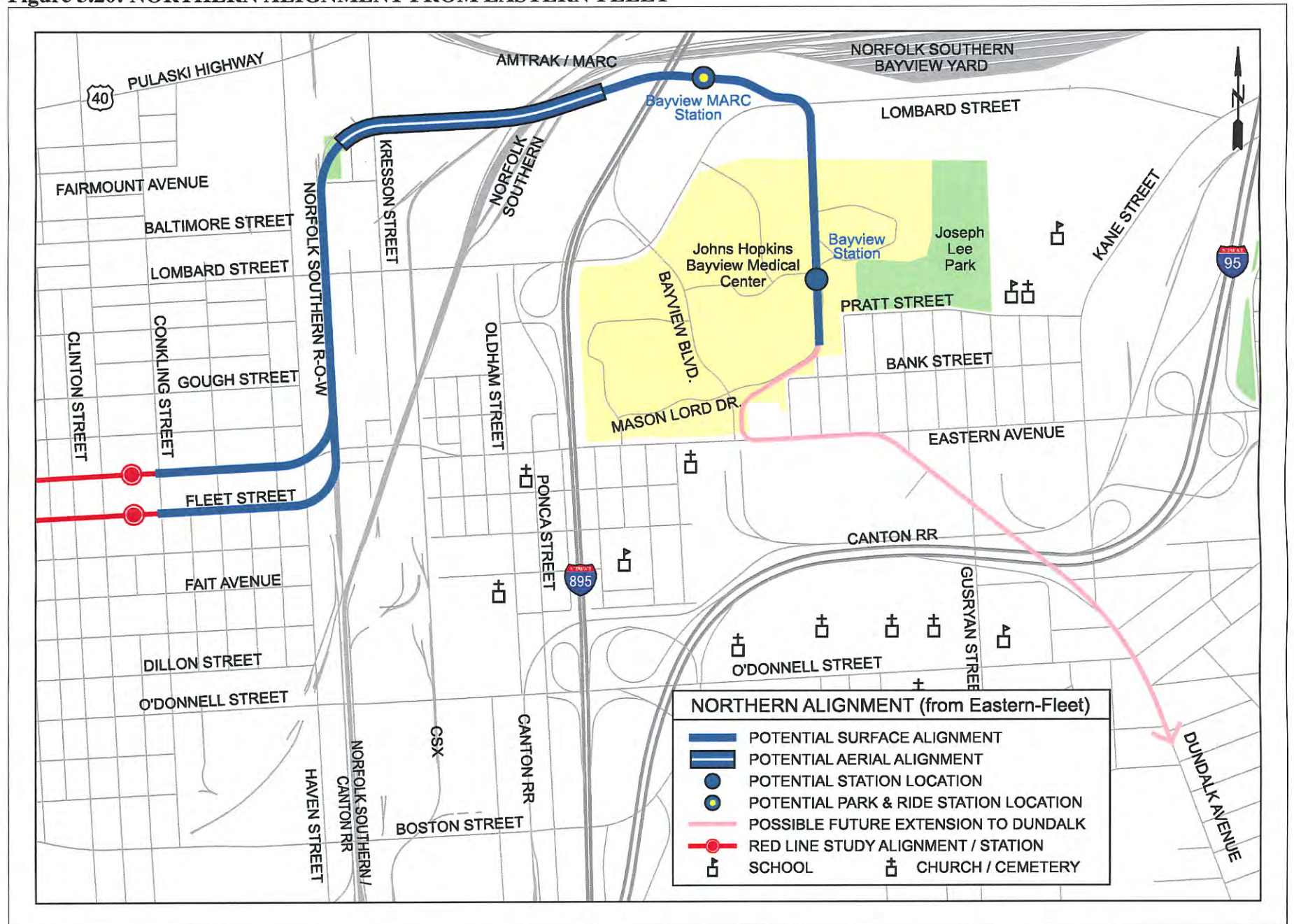
Environmental/Contamination Concerns

There is a moderate potential for contamination with this alignment.

Constructability

This alignment is likely to require a separate bridge or short tunnel to avoid structural modifications to the existing highway bridge.

Figure 3.20: NORTHERN ALIGNMENT FROM EASTERN-FLEET



NORTHERN ALIGNMENT FROM EASTERN-FLEET

Description

Beginning at Eastern Avenue and Fleet Street, this alignment would continue east on the surface of Eastern and Fleet to Haven Street. After crossing Haven Street at grade it would turn northward onto the currently inactive NS right-of-way. From this point further, this alignment follows the same route as the previously discussed 'Northern Alignment from Boston Street' all the way to the Bayview. A future extension to Dundalk could be accommodated. The transitway would continue at-grade to Bayview Boulevard, turning east on Eastern Avenue and then turning south onto Dundalk Avenue.

Stations (Bayview MARC and Bayview)

This alignment offers opportunities for stations at the proposed East Baltimore MARC station, and at the Bayview Medical Center. A conceptual plan of the park-and-ride lot at the Bayview MARC station is contained in Appendix A, Page 104.

Analysis

Access to Bayview

This alignment provides direct access to the heart of the Bayview Medical Center.

Connection to the proposed East Baltimore MARC Station

This alignment provides direct access to the proposed East Baltimore MARC Station.

Property Impacts

The curve from Eastern Avenue to the inactive NS right-of-way will require the acquisition of all or part of the property at the northeast corner of Haven Street and Eastern Avenue. The curve from Fleet Street onto the NS right-of-way will require the acquisition of the Meals-On-Wheels of Central Maryland headquarters property and the demolition of the building. Use of the abandoned CSXT right-of-way west of Kresson Street may require acquisition of the former railroad land from the current owner and the removal of a small railroad bridge still in place over Kresson Street.

Economic Development Opportunities

This alignment has no stations near proposed developments.

Compatibility with Rail Freight Operations

The alignment will require an operating agreement with Norfolk Southern and the Canton Railroad.

Impacts to Residences and Parking

There will be impacts to residences and parking along Eastern Avenue.

Impacts to Business Operations

There will be impacts to business operations along Eastern Avenue.

Traffic Impacts

Transit at grade on Eastern Avenue and Fleet Street will have impacts to traffic along Eastern Avenue.

Environmental/Contamination Concerns

There is a higher potential for the presence of contaminated soils or groundwater with this alignment.

Constructability

This alignment provides the most favorable horizontal alignment approach for the transitway to cross under the I-895 right-of-way near the south end of its viaduct over the NS Bayview railroad yards and Amtrak's Northeast Corridor.

Special Concerns

This alignment would impact publicly owned parkland at Janney Street Park. This park is maintained by Baltimore City. According to the Section 4(f) of the U.S. Department of Transportation Act of 1966 (49 U.S.C. 393[c]), the use of land from a publicly-owned parks or recreation area, wildlife or waterfowl refuge, or land from a significant historic site (as determined by the official having jurisdiction over the park, recreation area, refuge or site) only if there is **no prudent and feasible alternative** to using that land; and the project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use. As other prudent and feasible alternatives exist, this alternative should be eliminated from further consideration.

Figure 3.30: RED LINE EXTENSION TO BAYVIEW – ALL STATIONS

